VOL. XXVI. Nº 12. DECEMBER 1941

MECCANO MAGAZINE



A "BOTHA" OVER THE CONVOY

6D.

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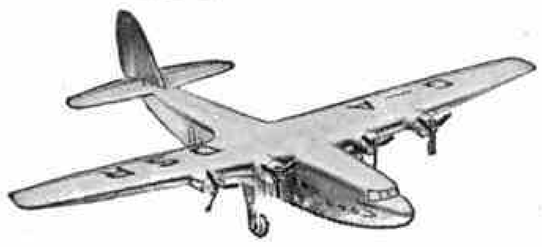
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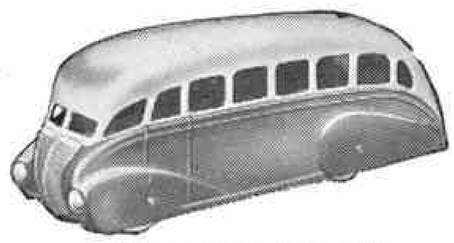


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Price **2/6** with Tax **3/–**

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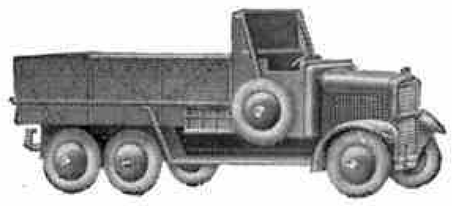


Dinky Toys No. 29b

Fitted with rubber tyres.

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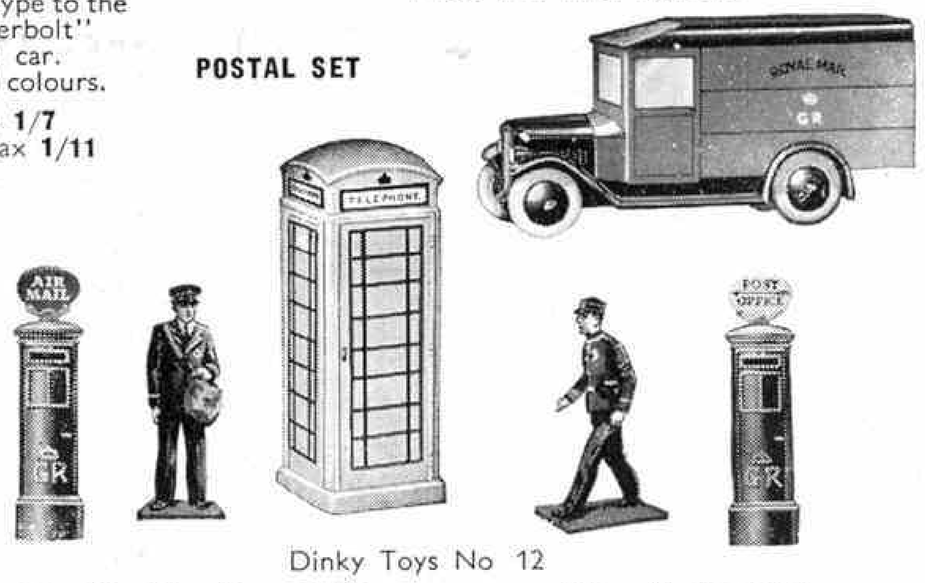
STREAMLINED RACING CAR

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Similar in type to the "Thunderbolt" speed car. Assorted colours.

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No. 12c Telephone Call Box	**9d.** with Tax	**11d.**
No. 12d Telegraph Messenger... ...	**7d.** with Tax	**8½d.**
No. 12e Postman	**7d.** with Tax	**8½d.**
No. 34b Royal Mail Van	**1/10** with Tax	**2/3**

Price of complete Set **4/9** with Tax **5/9**

DOUGLAS DC-3 AIR LINER

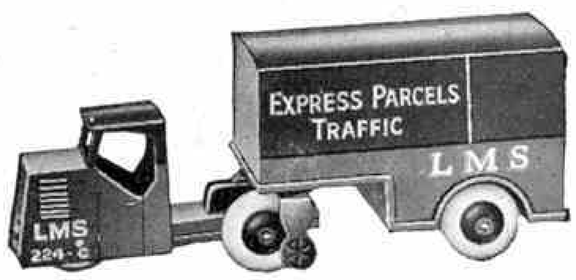


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Scale model of the Douglas DC-3 air liner, which is in regular service on many American routes.

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RAILWAY MECHANICAL HORSE AND TRAILER VAN



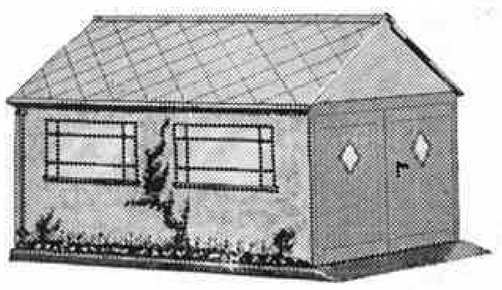
Dinky Toys No. 33R

No. 33Ra Railway Mechanical Horse. Price **1/3** with Tax **1/6**

No. 33Rd Trailer Van. Price **1/5** with Tax **1/9**

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Dinky Toys No. 45

Fitted with opening double doors. Will accommodate any two Dinky Toys Motor Cars.

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SPECIAL NOTICE

Will readers of the *"Meccano Magazine"* please note that, due to pressure of other work, we have been compelled temporarily to discontinue our Repairs Department, and no further work of this kind can be accepted.

When we are able to resume work in our Repairs Department we will at once make an announcement in the "M.M." and to our dealers.

MECCANO LIMITED

Something from Hamleys for Christmas, please.

PUT THAT IN YOUR LETTERS HOME! GET THE IDEA INTO GROWN-UP HEADS SOMEHOW!

Of course, we've all got to realise that this Christmas must mean fewer presents and more War Savings—and that holds good whether we're giving presents or getting them. (Hamleys themselves can't get nearly all the toys they want to sell you—because many toys are made of war materials).

But that's all the more reason for seeing what Hamleys have got in order to be quite certain that the presents we do give or get are absolutely top-notch and exactly what we want.

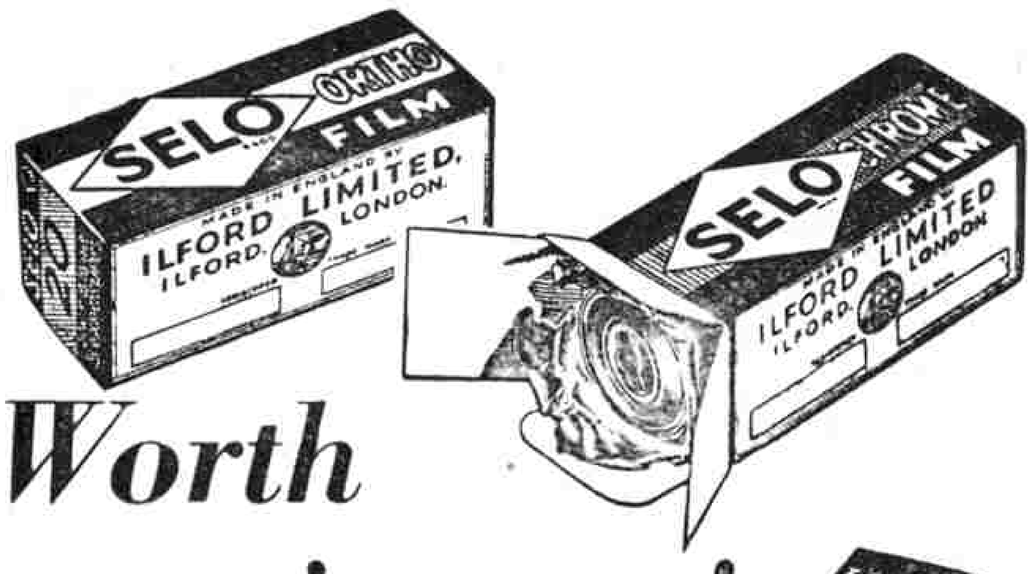
Hamleys have a wonderful Christmas collection despite war conditions. Whether it's model aircraft you want, kit sets, or Galleon building sets, or trains, or puzzles, or games, or books, dolls, animals, or mechanical toys, Hamleys have the best selection available. Ask for what you want. Tell Hamleys how much you want to spend and they'll send you the nearest thing they have at your price.

★ **WRITE TO** Hamleys Estd 1760 HAMLEY BROTHERS LTD

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Good News!



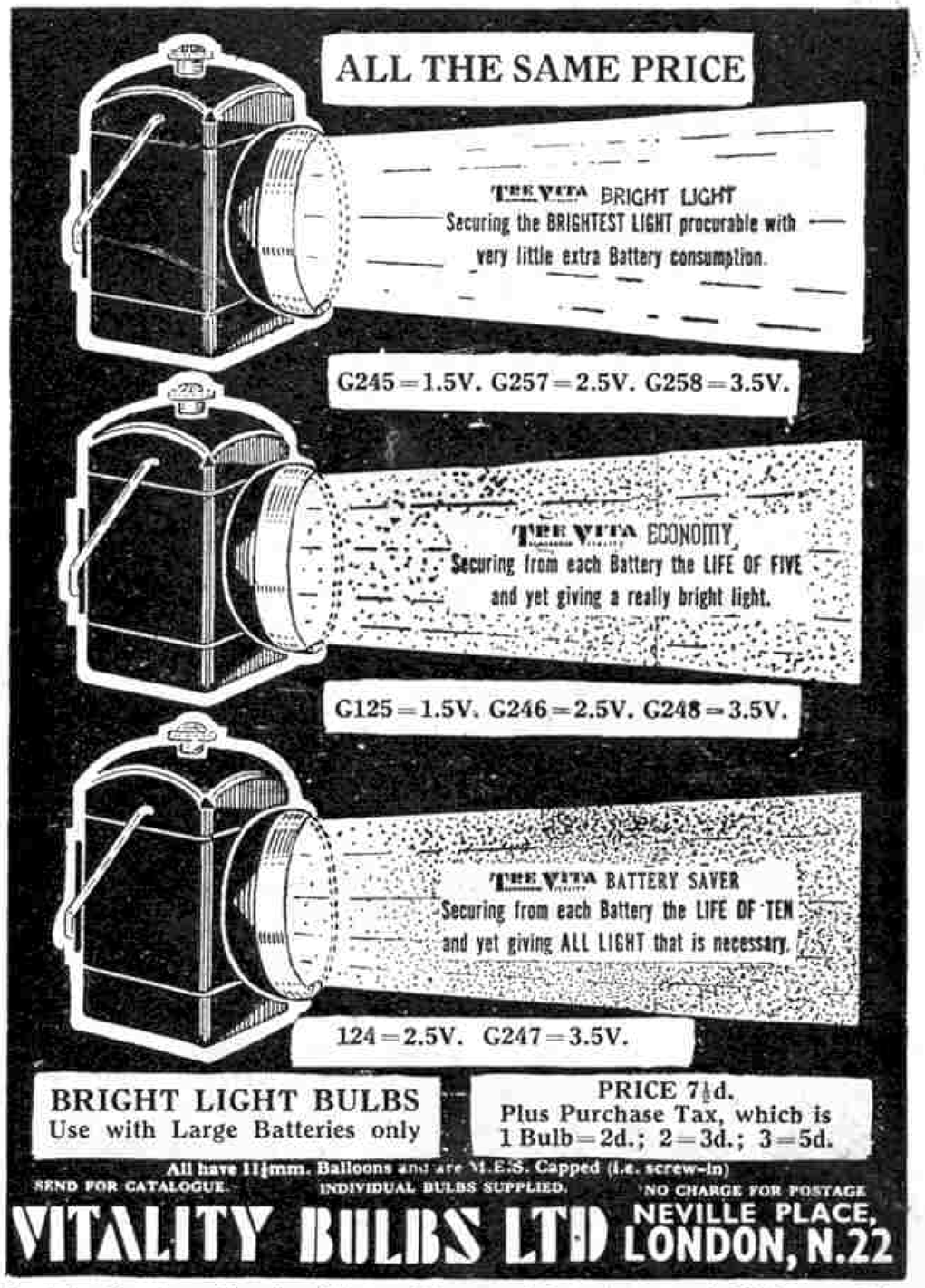
Webley

AIR PISTOLS AND AIR RIFLES WILL BE OBTAINABLE AGAIN AS SOON AS **VICTORY** IS WON

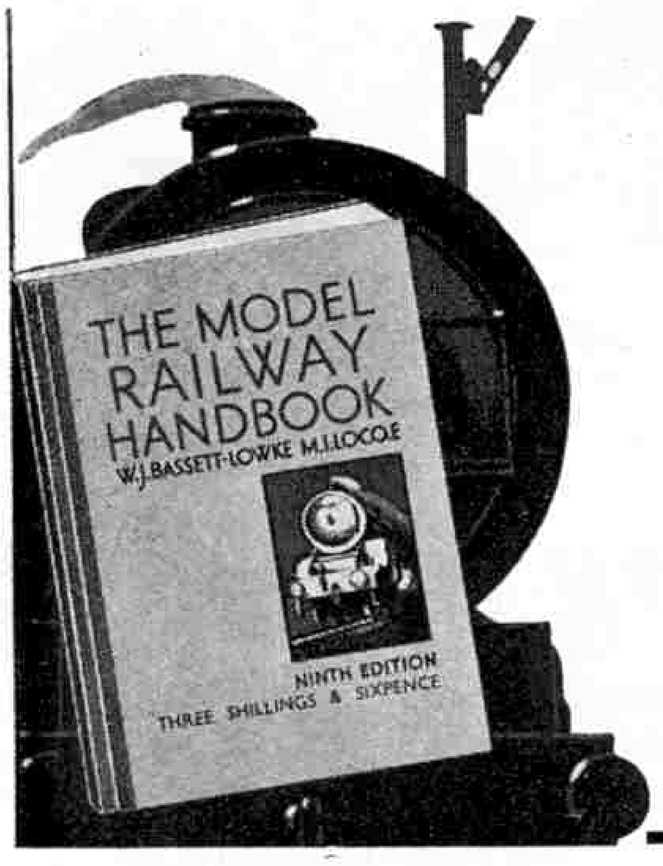
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on our "Popular" scale model permanent way!

Excellent for indoor and outdoor use

HERE IS your opportunity to get over the wartime difficulty in obtaining steel rail.

We have still in stock a limited quantity of our gauge "O" solid drawn brass rail, both for ordinary and electric traction.

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CATALOGUES

NEW GR/17 Gauge "O" Railway Equipment. 9d. post free.

WTC/17 Catalogue of Wartime Supplies. 1/- post free.

TT/17 Gauge "OO" Catalogue of the Twin Trains. 3d. post free.



Send postcard for Leaflet PPW/17 giving full details, and secure some of this track while supplies are still available!

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STANDARD GAUGE "O" RAILWAY DIAGRAM giving all railway dimensions in inches and millimetres, as approved by the British Railway Modelling Standards Bureau for commercial scale models. Price 2/6d. post free.

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TRI-ANG
ALL BRITISH TOYS



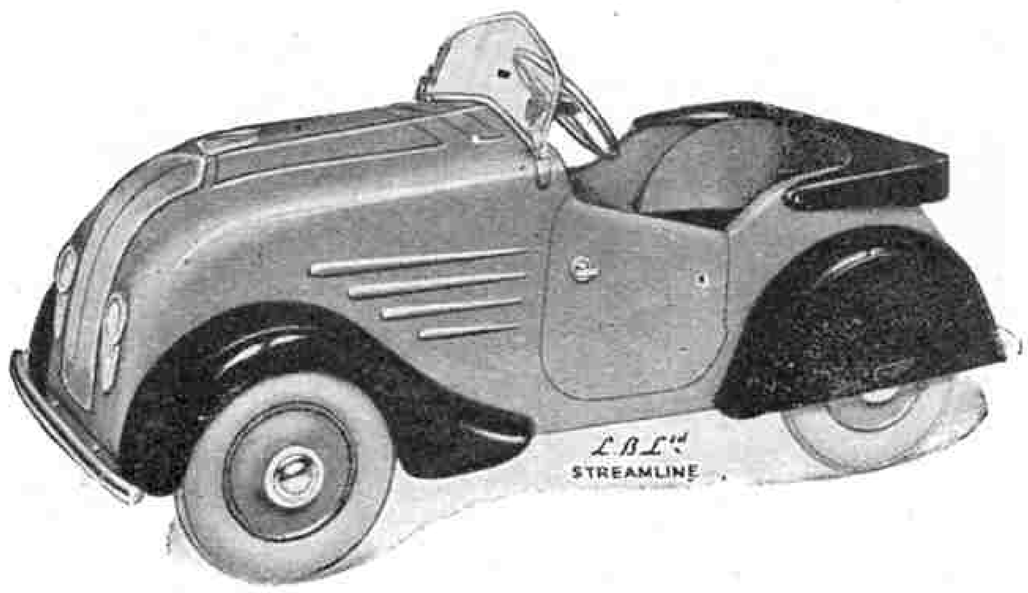
TRI-ANG TRICYCLE No. E2

Cycle chain drive with free-wheel. Frame and forks best quality weldless cycle tubing. 16 in. front and rear wheels. 1⅛ in. jointless sponge-rubber tyres. Roller lever brake. Ball-bearings throughout. Coil spring saddle. PLATED FITTINGS.



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Cycle tubular frame and forks, 14 in. wheels, 1⅛ in. jointless sponge-rubber tyres. Ball-bearing pedals. Roller lever brake. Two-coil saddle. Chain cover. Stand. PLATED FITTINGS.



STREAMLINE

Steel body with opening side door, upholstered seat. Adjustable wind screen and direction indicators. 9 in. new type easy-clean wheels with malleable hubs, ⅝ in. tyres. Hand brake. Length 44 ins. Suitable for ages 4 to 7.

MINIC
ALL TO SCALE CLOCKWORK TOYS

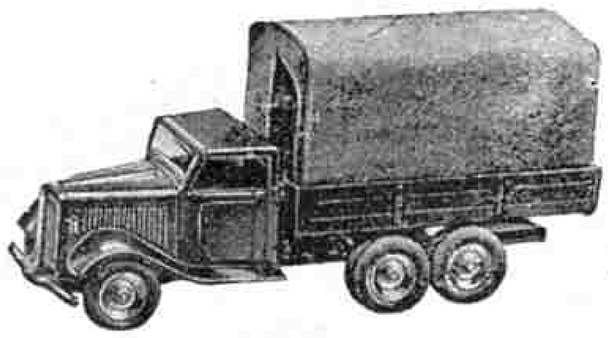
Almost every type of road transport is represented. Each model is strongly constructed and fitted with long-running mechanism and some are fitted with electric lights.



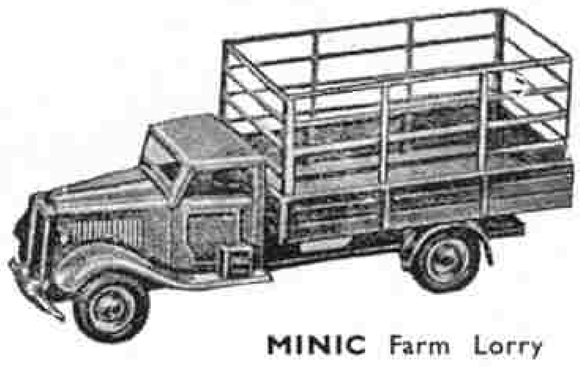
MINIC Tank. Length 3¼ ins. Obtainable in camouflage colours.



MINIC Mechanical Horse and Milk Tanker.



MINIC Canvas Tilt Lorry. Obtainable in camouflage colours.



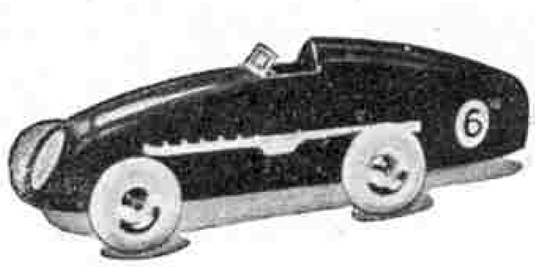
MINIC Farm Lorry



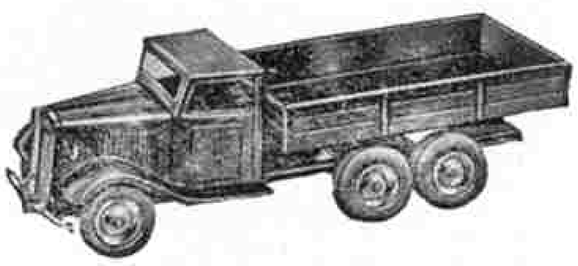
MINIC Transport Van.



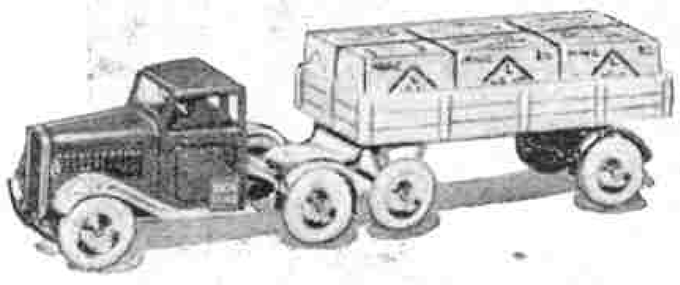
MINIC Traffic Control Car.



MINIC Racing Car. Length 5½ ins.



MINIC Six Wheel Army Lorry.



MINIC Mechanical Horse and Trailer with Cases. Length 7⅞ ins.



MINIC Mechanical Horse and Lorry with Barrels.



MINIC Vauxhall Cabriolet. Obtainable in camouflage colours.



MINIC Timber Lorry. Length 5½ ins.

MADE BY LINES BROS. LTD., Tri-ang Works, LONDON S.W.19

MECCANO MAGAZINE

Editorial Office:
Binns Road, Liverpool 13
England

Vol. XXVI. No. 12
December 1941

With the Editor

The 1942 "M.M."

Since 1920 the "*M.M.*" has appeared year after year with its present size of page. This month I have to tell my readers that the January 1942 and subsequent issues will have a page just half this size. In other words the "*M.M.*" will have the "pocket" form that recently has been adopted by so many magazines. This change, which I make with very great reluctance, has been forced upon me by the shortage of paper.

Although the Magazine will thus change its size, it will remain the same in every other respect. The coloured covers, which are unique among the world's periodicals, will be continued, and except that a certain amount of smaller type will have to be used, the style and arrangement of the inside pages will remain unchanged. All the regular features will be retained and there will be plenty of room for special articles. My plans for 1942 include some striking articles on topics connected with the war, and others dealing with engineering developments, how things are made, and lives of famous engineers and inventors, beginning with Edison, in many respects the most remarkable inventor in history.

So, readers all, when you open your January Magazine you will find that it is just the same old "*M.M.*" to which you have looked forward month by month.

Share Your "M.M." With a Friend

The demand for the "*M.M.*" has increased rapidly during the war, but unfortunately the paper restrictions have made it impossible to increase in proportion the number of copies printed each month. As a result many boys have been disappointed. I am doing my best to meet the demands of local retailers, however, and as a step in this direction I have decided that, for the time being, I cannot accept any new direct mail subscriptions.

During the coming year I ask every reader to help me by sharing his "M.M." with someone who is unable to buy a copy.



Joseph V. Stalin.

Leaders in the War

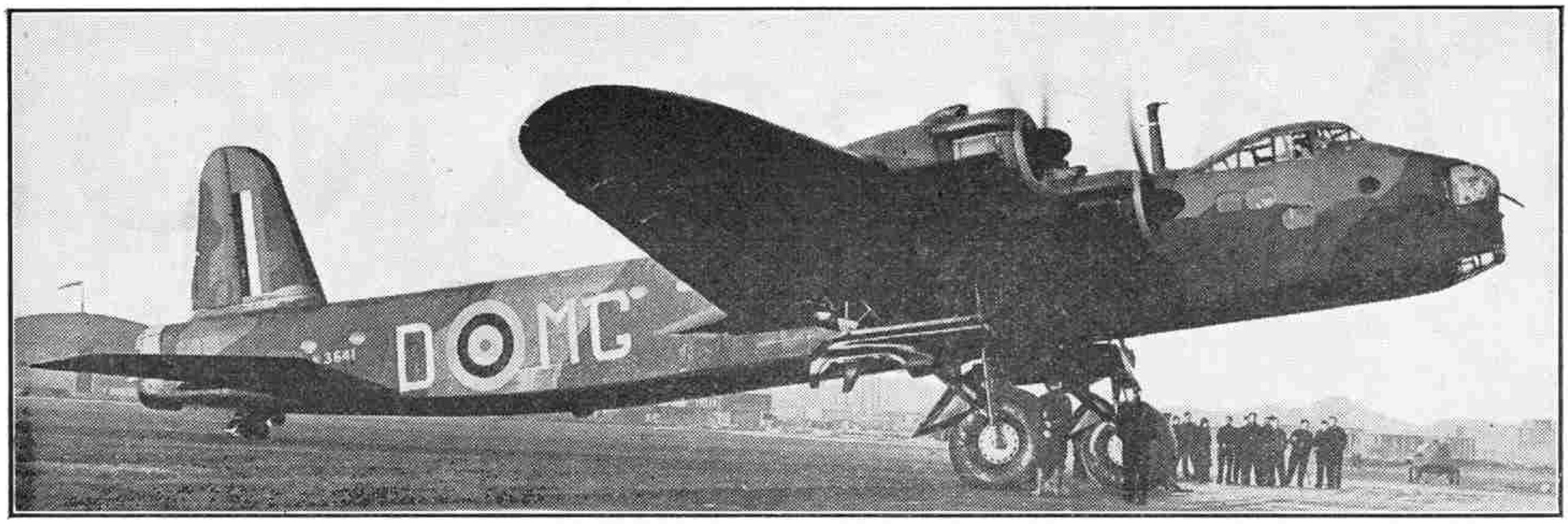
XXV.—Joseph V. Stalin

Joseph V. Dzhugashvili, or Stalin, was born in 1879 at Gori, Transcaucasia, his father being a peasant who later became a shoemaker. He joined the revolutionary movement at an early age, and acquired the name Stalin, or steel-like, on account of his courage and coolness. He was repeatedly arrested and banished, but escaped every time. He organised the Bolshevik Party in the first Duma or Elective Council, 1906, and in 1917 became organising secretary to the Central Executive Committee. After the death of Lenin he attained chief power, and now as Chairman of the Council of People's Commissars and General Secretary of the Communist Party, he occupies a position corresponding to that of Premier. Since the German attack he has assumed the office of Minister of Defence. He is well fitted for this post for he has had a wide experience of war. After the Revolution he was largely responsible for organising the campaigns in defence of the Soviet Union, and his success led to the name of the town of Tsaritsyn, one of the main business centres on the Volga, being changed to Stalingrad. His prestige in Russia to-day may be compared with that of Mr. Churchill in this country.

On 12th July 1941 was signed in Moscow by M. Molotov and Sir Stafford Cripps, British Ambassador, the Anglo-Soviet Pact that makes Russia officially our ally. Stalin was present at the ceremony.

Stalin is described as of medium height, broad shouldered and sturdily built, with thick black moustache and black hair brushed straight back. He dresses simply in a tunic and trousers thrust into knee-boots. He lives simply and greatly dislikes publicity in regard to his private affairs.

In the past we have always felt that Stalin was in many ways rather a mystery; but in recent months we have come to realise something of his personal dignity, his great determination and strength of character, and the enormous influence he exerts over the one hundred and eighty millions of Soviet Russia.



Short "Stirling" heavy bomber.

This Bombing Business

By C. G. Grey

(Founder of "The Aeroplane" in 1911 and Editor until September 1939)

THIS bombing business somehow reminds me of the story of the small boy who, after his father had given him a licking, with the usual remark that it hurt him (father) more than it hurt him (son) said: "Did your father lick you when you were a little boy, father?" And father said: "Yes, of course he did." And the boy asked again: "And did his father lick him?" And father said: "Yes, of course." And the boy asked yet again: "And did his father lick him, and his father lick him too?" "Yes, of course," said his father.

"Well," said the small boy, "who began this nonsense anyway?"

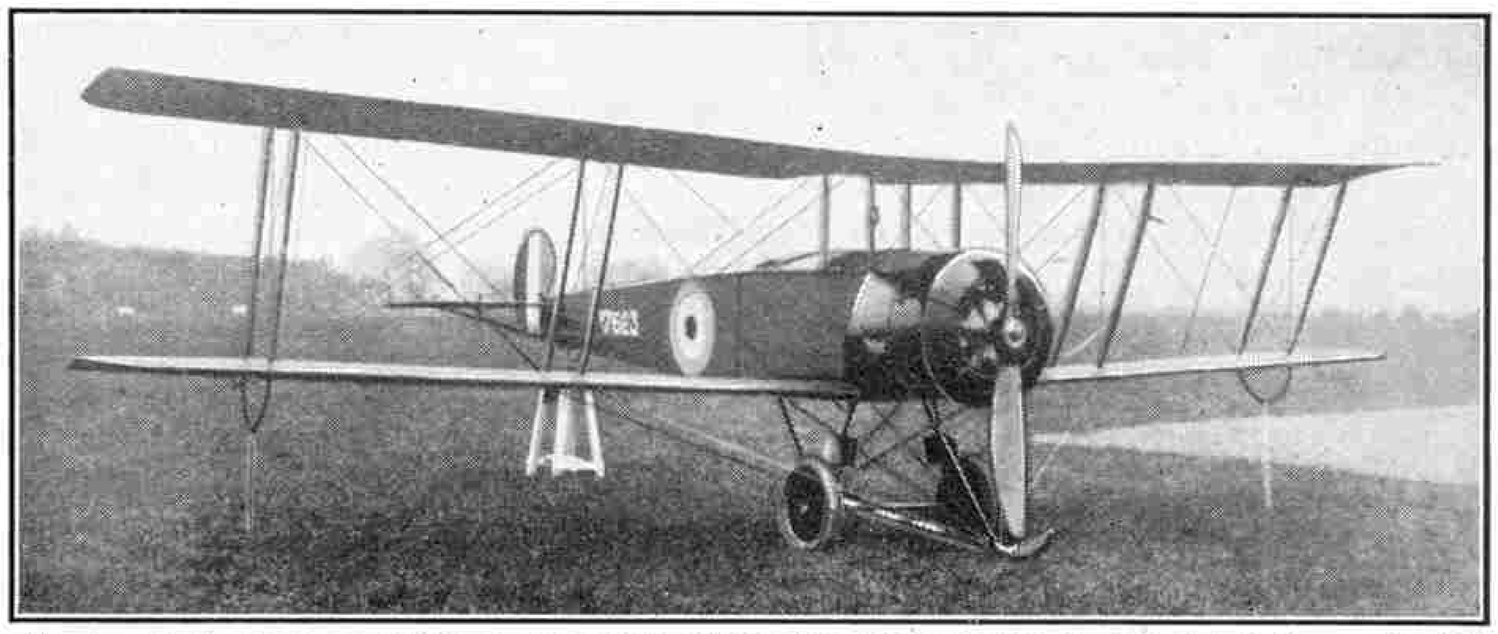
Actually there is a historical difficulty in finding out who did begin this bombing nonsense. But the lamentable fact is that as soon as people began to think about flying they began to think about bombing. Leonardo da Vinci, who invented machine-guns and all sorts of weapons in about the year 1500, had several schemes for flying-machines and dirigible balloons, although balloons were not invented for 300 years after that. And with them he set forth the idea of dropping explosives on people below. And Sir Alfred Tennyson, afterwards Lord Tennyson, Poet Laureate of Queen Victoria's time, wrote of the "ghastly dew" falling from "the world's aerial navies grappling in the central blue."

The first person to experiment with bomb-dropping in this country was Mr. Claude Grahame-White, who in 1912 or thereabouts tied a weight of 100-lb. underneath one of his old box-kites, arranged it with a slip-catch, and released it when flying at a hundred feet or so above the aerodrome at Hendon. We who were watching him quite expected to see the machine fall to pieces in the air, because the theory was that with 100 lb. slung on one spot underneath, the wings and everything would be deflected by the load, and when the load was suddenly released they would spring back with such a slap that something would probably break. Grahame-White told me when he landed that he felt no difference in the handling of the machine except that it was lighter on the controls. Which would be quite natural. But it was a mighty brave thing to do at the time.

During the war between Italy and Turkey in 1912, by which Italy acquired Tripoli, there were stories that the Italian aviators had dropped bombs on the Turks. And during the Balkan war in 1912-13 between the Greeks and the Bulgars and the Serbs on the one side and the Turks on the other, an English pilot named Snowdon Hedley who, with an Italian and a Russian, formed the Bulgars' Air Force, dropped something which was supposed to be a bomb on the City of Adrianople. But so far as he could discover no harm was done.

So bombing really began in the War 1914-18. And it began pretty soon. A German aviator told me some years ago that he had dropped a bomb on Paris quite early in August 1914—war was declared on 4th August 1914. I cannot recollect that any of our aviators dropped bombs anything like so early as that.

The first of our people who did any bombing were officers of a contingent of the Royal Naval Air Service, whom the Navy did not want.

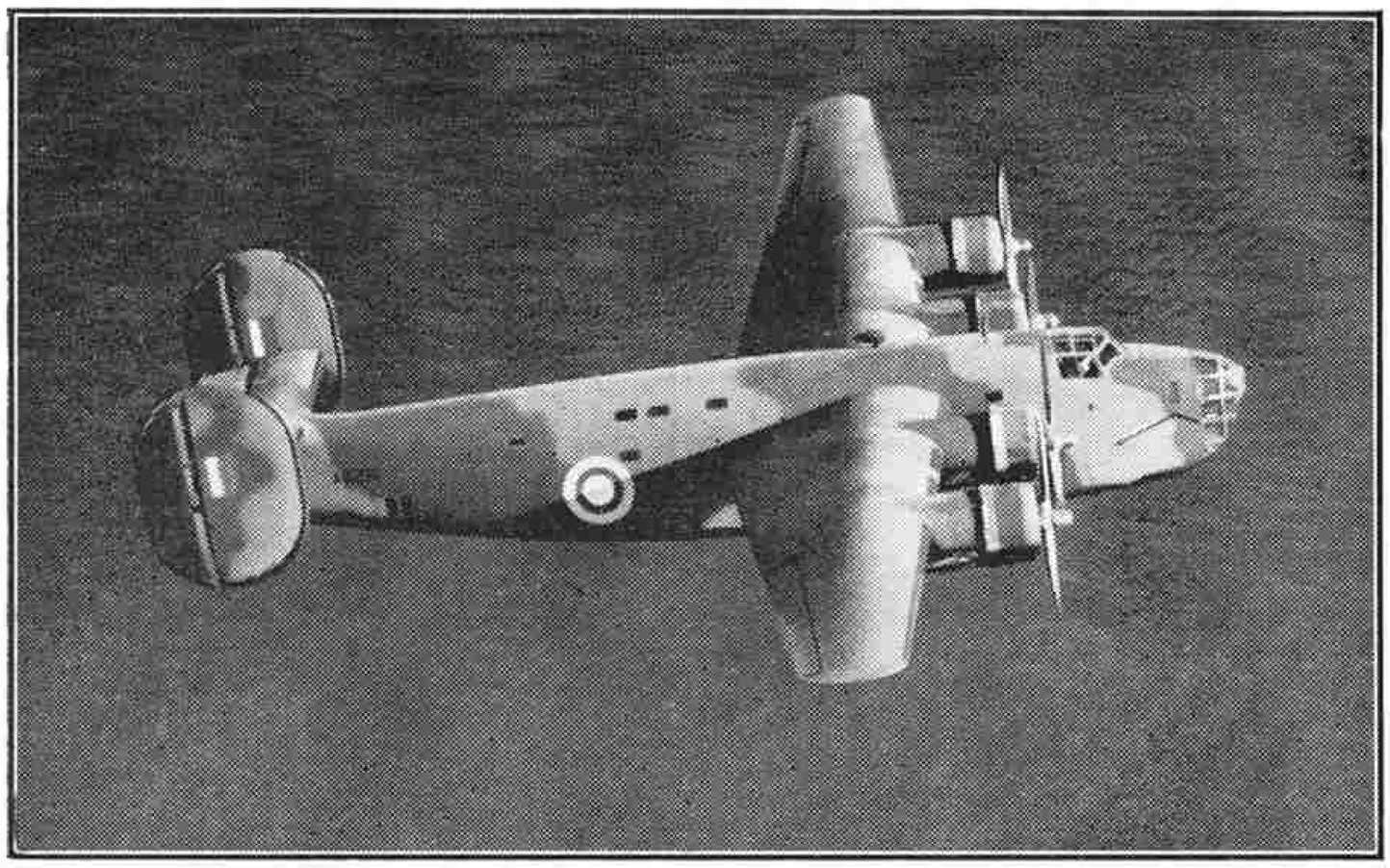


The Avro 504K, the famous British machine of the 1914-18 war. Photograph by courtesy of A. V. Roe and Co. Ltd.

Commodore Murray Sueter, R.N., now Rear-Admiral Sir Murray Sueter, M.P., sent a detachment to Belgium to try to help the Belgian Army which was being forced back by the first German attack while the British Army was retreating from Mons. One of these officers, Flt. Lieut. Reggie Marix, now Air Commodore R. L. D. Marix, D.S.O., dropped a bomb on top of the Zeppelin shed at Dusseldorf. Fortunately there was an airship inside and it caught fire and blew up. On the same day Squadron Commander Spenser Grey dropped a bomb on the railway station at Cologne, and broke a lot of glass, but did no great damage to the railway. Our bombs were very light in those days. Both of them used Sopwith tractor biplanes, which were the ancestors of the present historic Hawker "Hurricanes" and "Typhoons."

The bombs of those days were funny little things which weighed about 20 lb. apiece. They were carried tail upwards in a kind of piperack which was fixed to the outside of the fuselage. The tail-spindle of the bomb stuck up through a hole in the piperack, and was prevented from falling through by a pin which was stuck through the spindle and was tied to a piece of string or wire. When the pilot was over his target, or at a distance which he judged was right—for we had no bomb-sights in those days—he pulled the string, which pulled out the pin, which let the bomb drop out of the piperack.

It was primitive, but it worked quite well in the hands of people who knew how to use it. In fact the average accuracy of the bombing was not far short of what it is to-day. Bombing is rather like using a shot-gun. Either you can do it or you can't. I have seen an Irish gardener armed with a single-barrelled muzzle-loading shot-gun wipe the eye of a line of sportsmen armed with the finest sports guns that money could buy.



A Consolidated "Liberator" Bomber of the Royal Air Force. Photograph by courtesy of the Consolidated Aircraft Corporation, U.S.A.

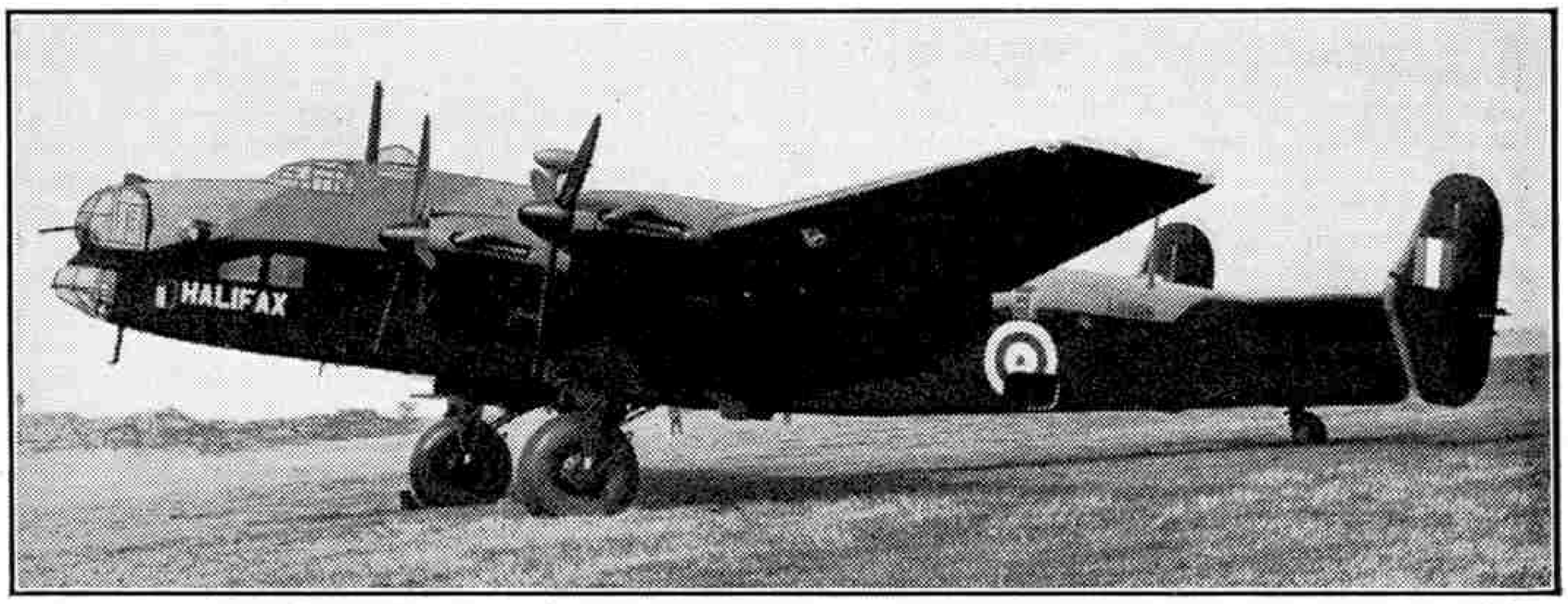
Another good effort in those early days was that of Squadron Commander Bigsworth, R.N., who dropped a bomb on the tail of a Zeppelin several thousand feet up in the air. For some funny reason it did not catch fire, but it went out of control and crashed on a house and was destroyed.

Another fine performance of those early days was the bombing of the great Zeppelin works at Friedrichshafen on Lake Constance. This raid was imagined, planned and organised by Squadron Commander Noel Pemberton-Billing, afterwards M.P., and now again trying to get into the House of Commons. He had three of the old 504 K. Avro biplanes which were arranged to carry bombs underneath the fuselage with proper bomb-release gear. They were taken out to Belfort in the far East of France and housed in the French airship shed there, and were flown straight off without any test-flying at all. The three pilots, Squadron Commander John Babington, Squadron Commander Featherstone Briggs, and Flight Lieut. S. V. Sippe, got the D.S.O. and the French Legion of Honour. Briggs was shot down and was a prisoner in Germany for a year before he escaped. The other two got back. They did little damage, but they scared the Germans so that they had to keep 4,000 men permanently on duty to protect those sheds.

There was a lot more bombing in that war, about which one could easily write a very big book.

In this present war there was really no bombing until the Germans attacked Norway in 1940. From the declaration of war on 3rd September, 1939 until then the Germans tried to bomb our convoys at sea, and they sent reconnaissance machines, which did carry a few light bombs, up to the Shetlands and the Orkneys looking for the British Fleet. Quite a lot of them were shot down by our fighters from aerodromes on shore. But there was no serious bombing. In fact the first casualty on British soil happened when one of these reconnaissance machines tried to bomb a flying-boat on a loch in the Orkneys, and landed his bomb on shore where it killed a rabbit.

We on our part used to send our big "Whitley" bombers on long journeys across Germany at night, dropping



Handley Page "Halifax," one of the latest types of heavy bombers in service with the R.A.F. Photograph by courtesy of "The Aeroplane."

millions of pamphlets to tell the German people that we had no grievance against them and that all we wanted to do was to turn out their Nazi Government which had run them into the war. For some queer reason the wording of those leaflets was not published in this country until copies reached some of our newspapers in a roundabout way, and then the wording was found to be so futile that one could not imagine the German people paying any attention to them.

Still, these "bomphlet" raids, as they were called by Mr. A. P. Herbert, in the House of Commons, did provide a number of our pilots and navigators with very good practice in finding their way about Germany at night. But whether the amount of practice they got was worth the number of machines which crashed and the number of people who were killed landing in the dark on the way home, or in forced landings in Germany, is open to argument.

The most serious work which the Bomber Command did during this period was in attacking German warships, mostly in the Heligoland Bight, and round about Bremerhaven and the Friesian Islands.

Our real bombing began when the Germans attacked Norway. There are some grand stories to be told of the work of our bombers. The way they used to go across the North Sea at night, knowing that if they were shot down or if their engines failed there would be very little chance of being picked up, was magnificent.

But I think that the bravest men I have ever seen were the pilots and observers of a small detachment of the Fleet Air Arm which was attached to our Coastal Command to lay mines round the coast of Denmark and in the Skagerrak and The Kattegat and in the Baltic Sea itself. They were carried in old Fairey "Swordfish" biplanes which had been designed as torpedo-bomber-reconnaissance machines for the Navy. An enormous cylindrical mine with flat ends fore and aft, and a huge parachute to let it down lightly in the water, was carried where the streamlined torpedoes should have been, underneath; and to give them the range for the distance they had great big tanks, also cylindrical with flat ends, fixed on top of the fuselage behind the pilot and in front of the navigator, over the middle seat where the navigator should have been sitting, instead of in the aft gunner's seat where he was.

Their speed with full load could not have been more than 80 m.p.h. And yet with one engine they used to start out over hundreds of miles of hostile country to lay those mines in the Baltic. And the amazing thing was that nearly all of them got home safely. It is a remarkable proof of the quality of their engines and navigation.

I think that one of the best stories of the "bomphlet" period is that of a bomber crew who took off in fog, got up into clouds, and flew for hours over Germany without seeing anything at all, hoping all the time that the weather would clear. At last the skipper decided to come back. After some more hours' flying the navigator assured him that they were not over Germany, and that they were over France although he could not tell where. Remember that he was flying on dead-reckoning and had no radio direction.

The pilot let the machine down gradually, for by now daylight had come, and he hoped to see ground. At 1,000 ft. he decided that he dared not come lower for fear of hitting the top of a hill or a church spire. So he gave the crew orders, on the intercommunication telephone, to bail out.

The member of the crew who told the story to a friend of mine said that he got out all right, hit the ground rather hard and passed out. When he came to he found himself surrounded by a creamy glow. At first he thought it was the atmosphere of Heaven; then he discovered that it was only his parachute which had settled on top of him as he landed in a flat calm. He picked himself up and found that another member of the crew had landed up a few hundred yards away. In the next field they found the skipper. But there was no sign of the aeroplane or of the tail-gunner. So they went along until they found a road, and they walked down it until they found a village, and walked along until they found an inn.

They had just settled down to drink to the soul of the departed air gunner, in hot wine, when the door opened and in he walked. And they fell on his neck and asked him what had happened.

He said that he got the order to jump all right and answered it, but then he found that either the office window was stuck or he was so frozen stiff that he could not open it. And anyhow he was so cold that he didn't care much whether he lived or died. So he stopped where he was.

Presently there was a mighty crash and he was thrown out on the ground. He lay there for a bit, and then, ending the story, he said: "It wasn't so cold on the ground as it was up aloft, but if the machine hadn't caught fire I should have been frozen to death!"

I suppose everybody who reads these notes will by now have seen that magnificent film *"Target for To-Night."* That gives a better idea of what a real bomb-raid is like than can anything that has appeared up to this stage of the war.

In due course I suppose we shall have similar pictures of raids in our great Short "Stirlings" and Handley Page "Halifaxes" and other tremendous machines which are coming along. And of course we shall be given pictures taken away up in the stratosphere in the American "Flying Fortresses." For its special job, the "Flying Fortress," as it is called, although it is by no means a fortress if attacked, is interesting. But let us remember that the Right Hon. Lieut. Col. J. T. C. Moore-Brabazon, M.C., M.P., Minister for Aircraft Production, said at a big public lunch in London that "to-day we are building bigger and better bombers and fiercer and faster fighters than any nation in the World."

We are deeply grateful to the United States for sending us "Flying Fortresses," and still more so for sending us those excellent high-speed four-engined bombers, the "Liberators," and the "Catalina" flying boats, which are themselves exceedingly good. But there is no need to be unduly modest about ourselves. The fact is that in any category or class or type in which British aeroplanes can be compared with American, the British aeroplane has greater value all round as a weapon.

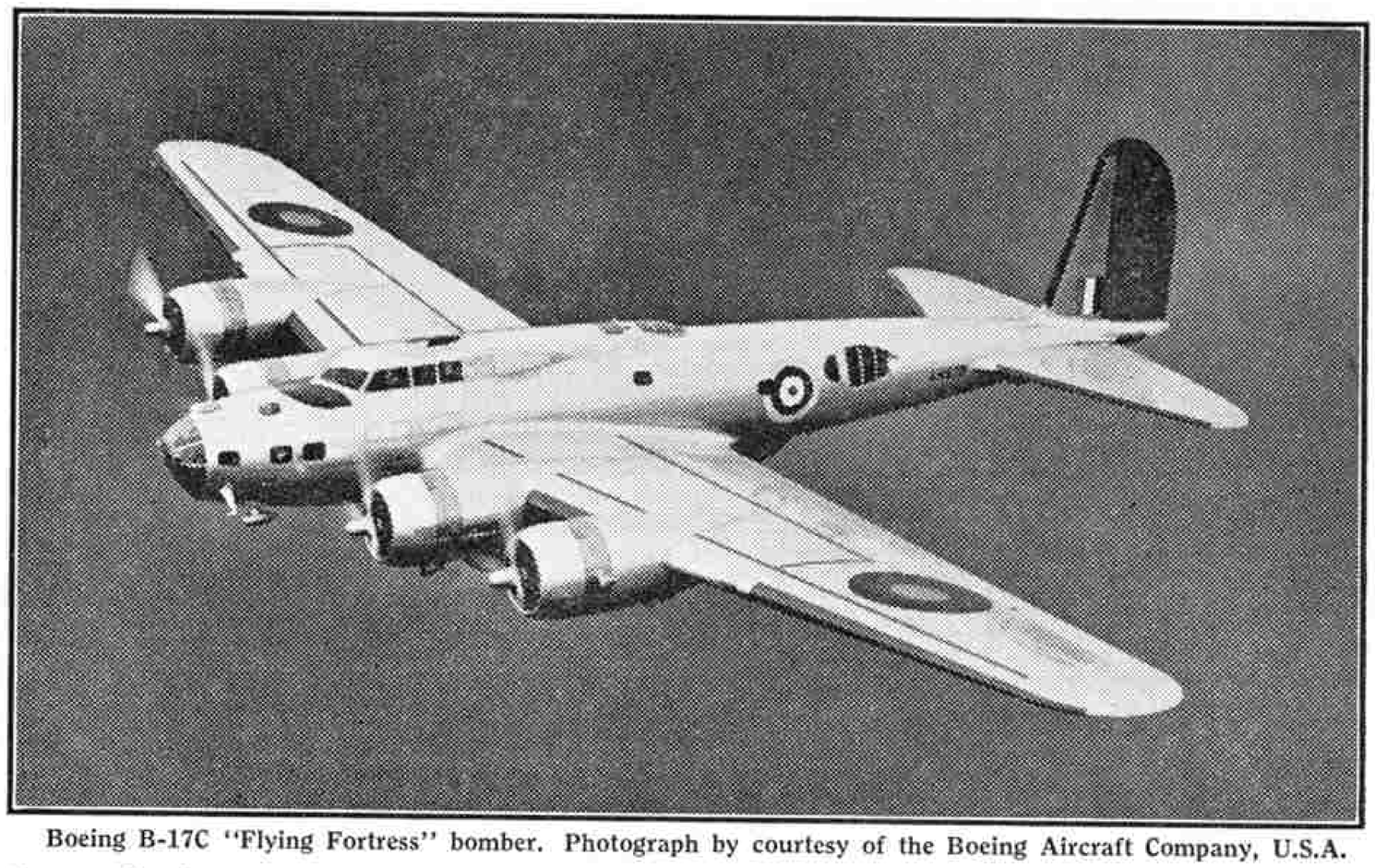
The American "Flying Fortresses" are built for very high level flying, in which none of our machines compete. Some idea of the accuracy needed in their bombing may be grasped by the fact that at a height between 30,000 and 40,000 ft., which is supposed to be their operating height, they are about seven miles above the ground. And to hit a target at that height they must release their bombs at least five miles before they get to their target.

Those of you who know the 47th proposition of Euclid will be able to calculate that they have to release their bombs about eight miles from the target.

Now just think of how much you could see of anything eight miles away. Think of standing on the top of the highest hill in your district and looking at a town eight miles away. And imagine what the accuracy of the bomb-sights must be to hit the town, let alone any particular target in it. And remember that even the most wonderful American gyroscopic sight cannot foresee the deflection of the bombs as they pass through layers of air which may move in different directions at all sorts of strengths between a breeze and a full gale.

Our "Halifaxes" and Short "Stirlings" are much bigger than the "Fortresses," and they carry bigger bomb-loads. They also operate from a much lower level, and the fact that photographs of the "Stirling" have been let out for publication by the Air Ministry is proof that some of them have been lost, because we never allow the publication of photographs of aeroplanes until we know that specimens of them are in the hands of the enemy.

These big bombers (Continued on page 394)



Boeing B-17C "Flying Fortress" bomber. Photograph by courtesy of the Boeing Aircraft Company, U.S.A.

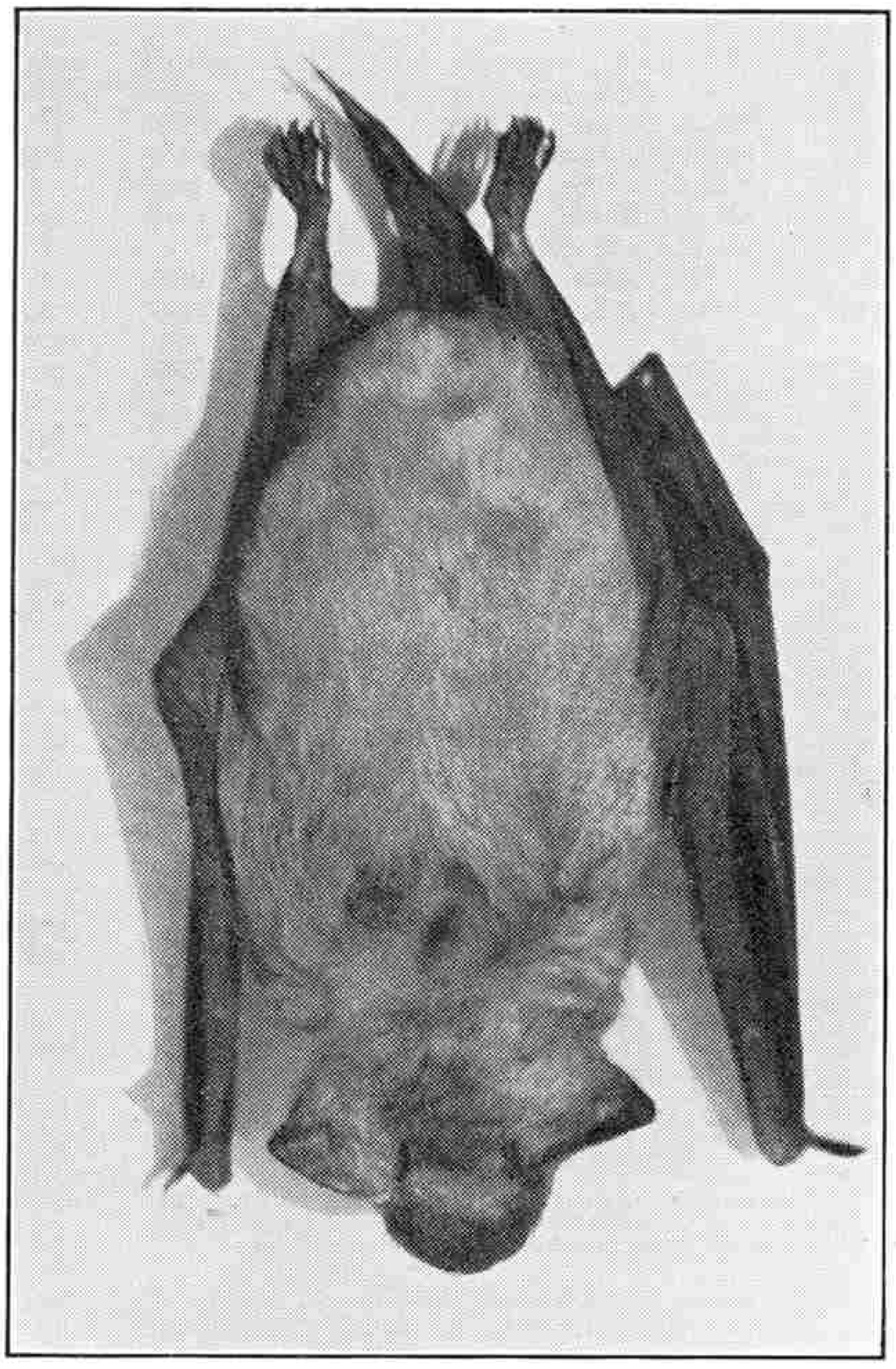
The Usefulness of Bats

By Eric Hardy, F.Z.S.

WE are so familiar with propaganda for the protection of useful birds that we are apt to forget that we have also some useful mammals or furred creatures that play an important part in agriculture, forestry, and even game preservation. Foremost among these creatures are the bats, the most active of the insect-eaters, and probably more subject to persecution and ignorance than any other animals we have. My photograph shows the biggest and most useful of them all, the great noctule or high-flying bat, which is really quite common in our big woods, even near the vicinity of towns. If we bear in mind that the bats continue at dusk the good work of the daytime swallows, swifts and martins, and aid the night-jar to destroy the flying moths and beetles that are the parents of the farmers' cutworms, the foresters' timber-borers, the wireworm and many of the pests of our garden greens, we shall better appreciate the plea to protect the bat.

No British bat is in the least way harmful. There is not the slightest truth in the country talk about blood-sucking bats or biting bats. If you catch a bat and squeeze it, naturally its tiny teeth will be brought into play to save its life; but when a bat flies into the bedroom through the open window, there is nothing to fear and its antics are only to find the way out again. Aid its escape with a wider window, or catch it gently in a cloth and release it outside.

We have some 15 bats on the official British list, but about half of these are too rare to be expected in most districts. The others—the little pipistrelle of the woods and the town parks, the solitary whiskered bat of the quarries and stone buildings, the long-eared bat of the woods and hollow trees, Daubenton's water-bat that glides like swallow or sandpiper low over the lake or trout pool, and the big noctule of the woods—are all very common denizens of the countryside, often abroad in very mild winter spells or some time before dusk reaches the open spaces. In Wales in mid-day sunshine in spring and summer I have seen the noctule bat flying on the wing as actively as at dusk, catching the day-flying beetles and grass moths and coming back to the old barn-wall at intervals to hang upside down by its hind claws while it uses its skinny fore-arms to help crunch its meal.



Noctule Bat asleep. It hangs upside down.

In the limestone caves of Wales and Yorkshire the curious horseshoe bats, with sensitive skin above their nostrils enabling them to fly in the darkest places like pine woods, and at the darkest hour of cloudy nights, are tolerably numerous.

Bats render valuable services, not only in the destruction of moths and beetle pests at night, but also in the daytime capture of disease-carrying gnats or mosquitoes. In Texas some years ago the medical authorities so respected their importance as destroyers of malaria-carrying mosquitoes that special bat-roosts were erected in treeless districts, and laws were passed for the creatures' preservation.

It is often stated that British bats are an uninteresting group of animals because one cannot tell one from the other without shooting it, stuffing it and examining it with the detail of a museum naturalist. But this is not so. Many of our bats may be difficult to identify, even in the hand, but most of the common ones are quite easily picked out with a little woodcraft. The solitary whiskered bat is not nearly so scarce as many a nature book suggests, and often as it is met on the wing, keen eyes will find it as frequently resting on the sun-warmed stone of its roosting site in quarry or belfry. The noctule bat flies higher than most bats, and if its larger size does not distinguish it, this high flight above the trees before dark should be a guide.

In summer activity the bats not only have their favourite roosting places, as have owls, but also their favourite feeding spots, for most of them prefer not to eat their prey on the wing, but to return to some wall or resting place to munch up their meal in comfort. In a side-street in Market Harborough one cubbing season we found that the shed-roof in the little town yard was used for this purpose. No bats roosted here by day, but each morning a litter of broken moth wings lay on the floor beneath, for a pipistrelle had made a rendezvous of the place.

British bats are only a small proportion of the bats of the world, however. In Java there are bats which, like bees at home, pollenate the flowers of certain trees they visit. In India and Australia there are the biggest of all the bats, the fruit-bats, sometimes called "flying foxes" because of their long, fox-like faces; some of them have a wing expanse of four feet—our common pipistrelle bat has a wing span of some four inches. At the other end of the bat tribe are the blood-sucking vampires, of which there are only two species.

A Great United States Power Scheme

The Bonneville Dam on the Columbia River

WE have come to look upon the United States as the home of enormous dams, for the authorities there are straining to make full use of the water power of their great rivers for the production of electric light and power. One of the most remarkable of these structures is the Grand Coulee Dam in the State of Washington. This is probably the largest structure yet built, and it was described and illustrated in our issues for November and December 1937. It stretches for a length of 4,300 ft. across the course of the Columbia River and its height is 550 ft. above bedrock, giving it a size three times that of the Great Pyramid of Egypt. Its chief purpose is to provide water for an area of more than a million acres of land that was formerly desert, but it also provides power.

The Grand Coulee Dam has already been completed and is in operation, but its construction is only a part of a great scheme that has been set on foot for making use of the water power of the Columbia River. This river rises in Canada, through which it flows for 465 miles before it crosses the border into the United States, to complete its journey of 1,210 miles to the sea. In its passage of 745 miles in the United States it falls through some 1,300 ft., and the aim of the authorities concerned is to complete a series of dams along its course to take advantage of as much of its power as possible. So far only three dams have been built. These are the Grand Coulee Dam already mentioned, a second at Rock Island constructed for a private company, and the Bonneville Dam, much lower down the river and at a point where its water is tidal, although this is 140 miles from the sea. It is with this last dam that this article is concerned.

The purpose of the Bonneville Dam is two-fold. On the one hand it improves the waterway by eliminating dangerous rapids, and making possible a deep channel extending many miles upstream; on the other it provides power and light on a large scale at cheap rates for use in the homes, on the farms and in the factories of the whole of the North West Region.

The dam was constructed by the Corps of Engineers of the United States Army, and is in two sections. At the point chosen for it there is an island, Bradford Island, in the river, the main channel of which flows north of it. Across this main channel has been built a spillway dam, while a powerhouse dam has been thrown across the south channel, where a navigation canal has been excavated and a ship lock constructed. The two parts of the structure are connected across the separating island by an earth dam.

The spillway dam across the north channel is 1,090 ft. in length, with a height above the lowest foundation of about 170 ft. At its base its width is 200 ft. Its giant reinforced concrete piers are 60 ft. apart and each is 10 ft. in width, leaving 18 openings 50 ft. wide between them. The openings are closed by gates of riveted steel divided horizontally into two sections, so that either the upper half or the entire gate can be lifted to allow the passage of water. When this is necessary gantry cranes travelling on the roadway on the crest of the dam are brought into use, and these are so powerful and smooth in action that the gates, each of which weighs about 200 tons, can be lifted by the action of one man.

The dam was built in two parts, that projecting from the island being constructed first. The site was enclosed within a gigantic cofferdam that was built on land in sections, each of which was then launched and sunk into its correct position. The sections, or cribs as they were called, were built of timber, and as the bed of the river is irregular in form each was shaped to fit well into the position it was to occupy. The shape required was discovered by special means. Efforts at first were made to take soundings by means of a wire cable and sinker, but the water flowed so strongly that the sinker was carried away downstream and accurate measurements were impossible. Instead, therefore, a special device consisting of vertical pipes extending downward nearly to the river bottom was brought into use. This was mounted on a barge, and steel rods passed downward through the pipes allowed the necessary measurements to be made at all positions to be occupied by cribs. Divers afterwards went down to ensure that each crib in turn was fitting well to its base.

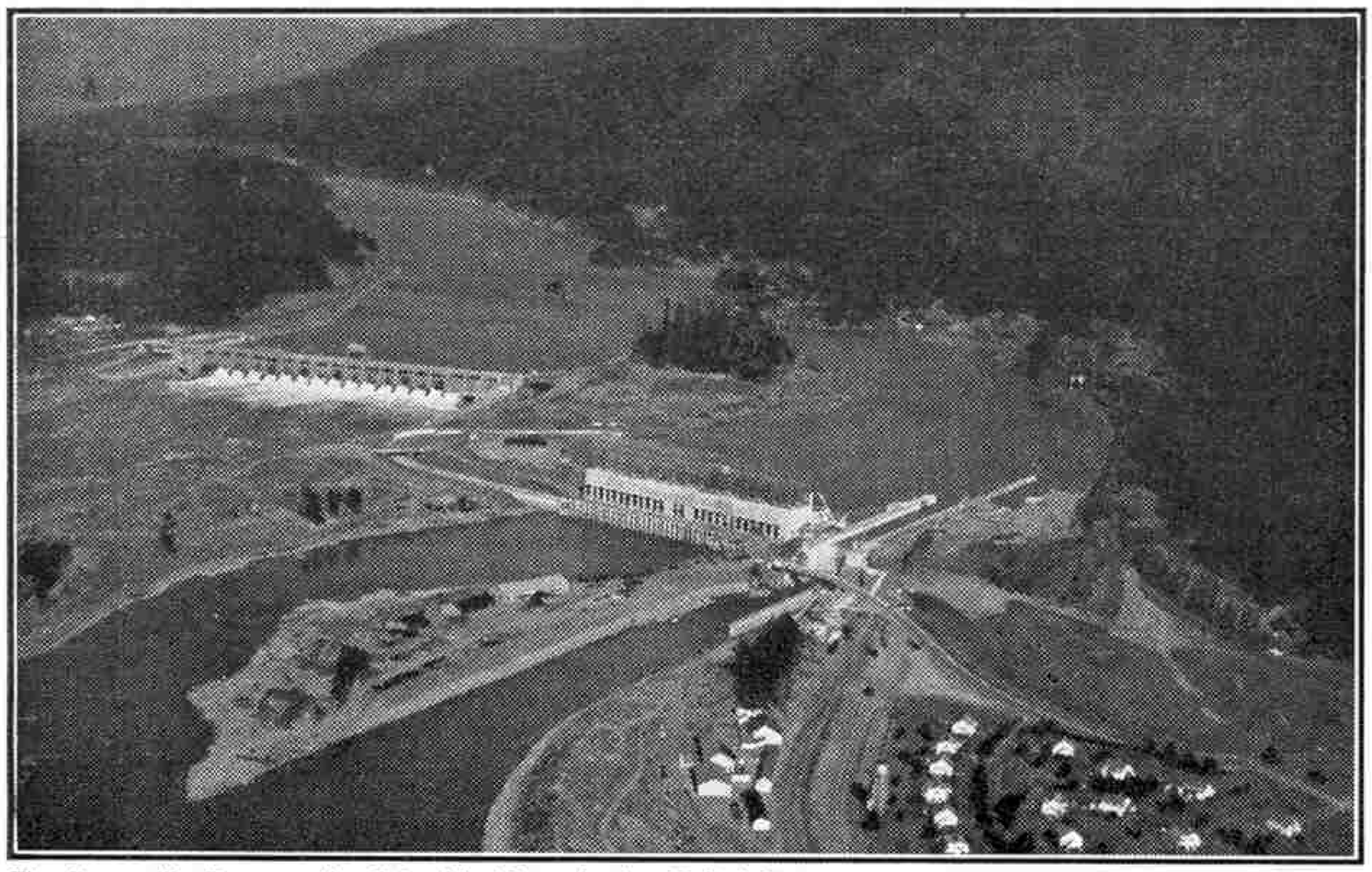
This work proceeded smoothly while the southern end of the dam was being constructed. The cribs were filled with rock and protected in places by sheet steel piling driven in by their outer faces, and the water within the cofferdam was then pumped out so that the dam could be built up. The concrete for this was brought from the mixing plants in buckets running on a double cableway with a span of 2,020 ft. This was carried on towers mounted on tracks on which they could be moved sideways over a distance of 850 ft. so that every corner of the site could be reached easily.

When work began on the remaining half, the cribs that were not required were removed by blasting. With this in mind steel pipes had been built into them, and charges of dynamite exploded in these shattered the timbers sufficiently to allow of the debris being removed by dredge and dragline, which also extracted the material with which the cribs had been loaded.

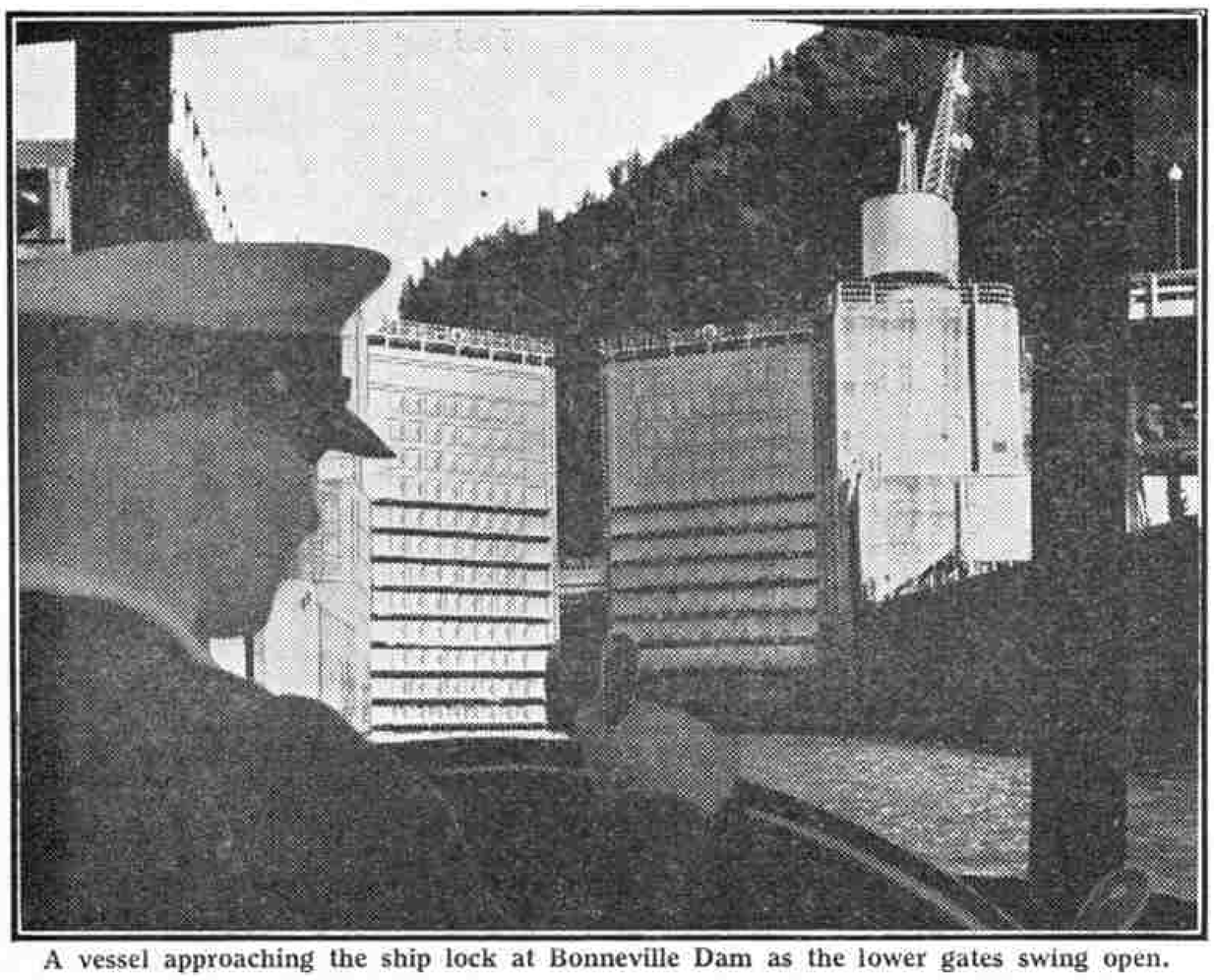
Then the construction of the second cofferdam was begun, but while four cribs yet remained to be placed in position the river rose in flood, considerably in advance of its normal time. The fill inside the cribs was washed away, together with part of the banks, until a gap 130 ft. wide was scoured out through which water rushed at a speed of 20 ft. per second. Several cribs that were nearly completed were carried away, and the gap could not easily be filled, for the stream flowed so quickly that rocks dumped from barges were carried too far down stream. In the end a trestle had to be built at an angle from the bank of the river to the nearest crib, and from this blocks of stone from six tons to 30 tons in weight were dumped. In this way a heavy rock bank was built up to close the gap, after which the cribs could be placed in position. The last of these was sunk in water 60 ft. deep, and the stream ran so quickly during this operation that the pull on the anchor line rose at times to 800 tons.

The spillway is designed to allow the passage over it of a flood heavier than the greatest ever recorded. The minimum depth of the river above it is now more than 30 ft. for a distance of about 45 miles upstream, and the gates give complete control of the flow.

The powerhouse dam is 608 ft. long and 180 ft. in height. It too is of reinforced concrete, with a greatest width of 207 ft., and on its upstream face are the great openings that lead to the chambers in which the water turbines are installed. The dam is built to accommodate six



The Bonneville Dam on the Columbia River, in the United States, seen from the air. In the centre is the powerhouse dam, with the ship lock and canal on the right. On the left is the spillway dam. The illustrations to this article are reproduced by courtesy of the Bonneville Power Administration, Portland, Oregon.



A vessel approaching the ship lock at Bonneville Dam as the lower gates swing open.

generating units, together with a small unit for supplying light and power for internal use, and there is space at the north end for four further units. So far two of the main sets and the house unit have been installed. Each of these main sets has a capacity of 43,200 kw., but two further units now under construction will have a capacity of 54,000 kw. The 60,000-h.p. turbines that drive the present generators have five-bladed runners, and each requires 12,000 cu. ft. of water per second for operating at full load under a head of 50 ft. The pitch of the blades is automatically controlled, so that as the gates open, permitting more water to enter, the blades move to a steeper angle. Each turbine weighs 900 tons, its shaft being more than 3 ft. in diameter at its main bearing; and the tube through which the water leaves the turbine itself is 23 ft. across.

Alongside the power-house dam is the lock built as part of a scheme for converting the Columbia River into a channel for ocean-going vessels. It is 500 ft. long and 76 ft. wide, and at extreme low water it gives a vertical lift of 66 ft., said to be the greatest of all locks yet built. Normally the lift is 59 ft., and at extreme high water it is 30 ft. The excavation for the lock was made in rock, the exposed wall surfaces being faced with concrete, additional height being given by the construction of concrete walls.

In spite of its huge size the lock is filled or emptied in about 15 min. Its great lower gate, each leaf of which weighs 525 tons, is 102 ft. in height, and air chambers are included in its lower half to give it buoyancy and thus reduce the weight to be raised. The upper gate is 45 ft. in height. All the machinery for operating the lock is electrically driven. A ship canal has been constructed to lead up to it from the downstream side, and this is spanned by a steel swing bridge to allow access to the power house and to the island.

A very interesting feature of the dam is the thought that has been given to the welfare of the immense numbers of fish that pass up and down the Columbia River and its tributaries. These swarm with salmon, trout and other migratory fish, on which a fishing industry valued at more than £2,000,000 annually depends. The most important are the salmon. Small salmon called fingerlings, hatched from eggs laid in the gravel stream beds, descend the river to the ocean, and after maturing there for three or four years return to their native stream and make their way upward to the spawning beds. A great dam across the river would have stopped them and ruined the fishery, so fishways have been installed to give them easy passage. These include fish ladders, inclined water passages 40 ft. in width that circle round the ends of the dam from the lower to the higher water level. At intervals of 16 ft. along these passages there are cross partitions 6 ft. in height, each 1 ft. higher than the one below it, and the water flowing down the passages spills over the partitions to form a series of pools. The salmon are attracted by the flowing water and readily climb from one pool to the next. There are also submerged openings 2 ft. square through which the fish can swim without rising to the surface.

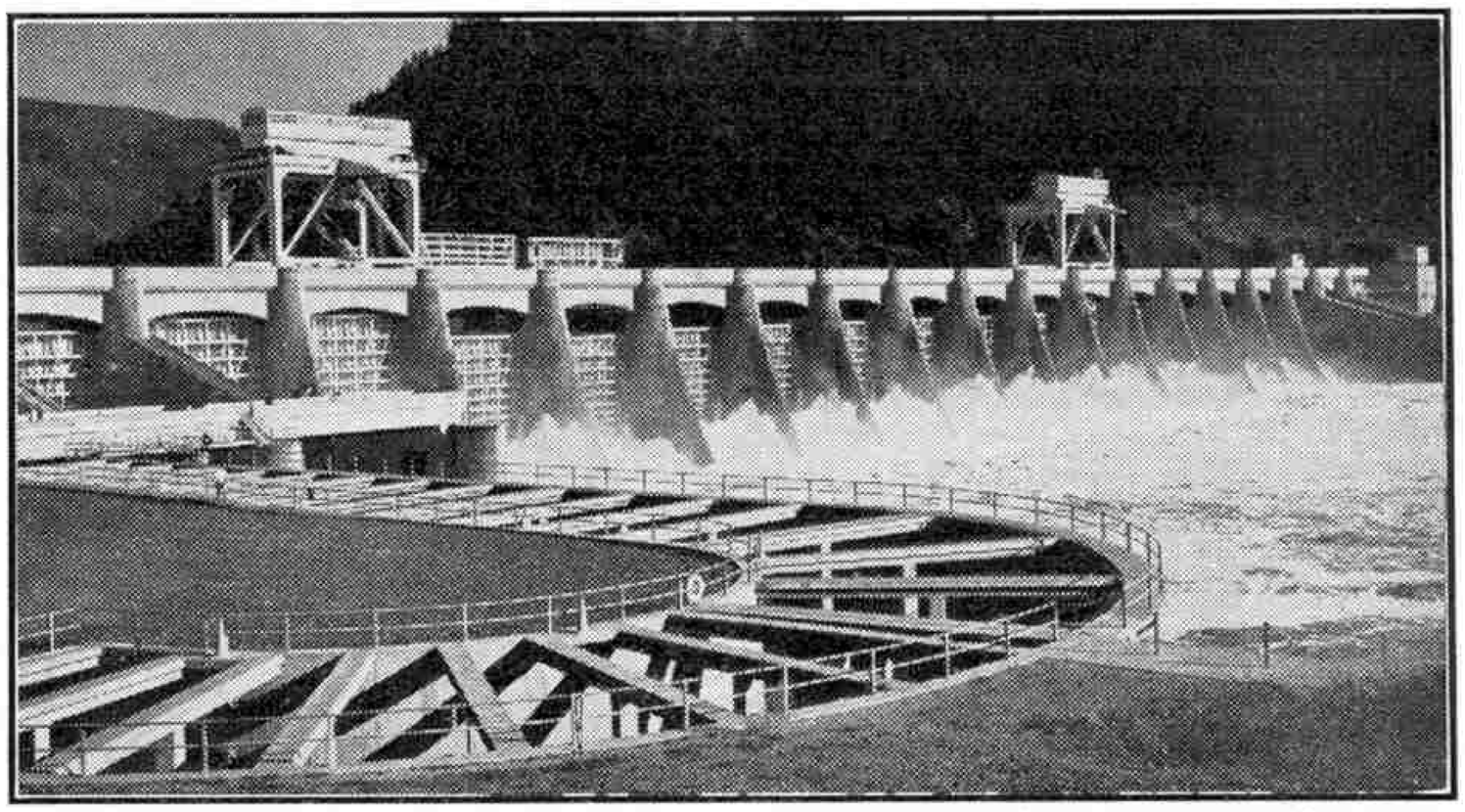
Locks similar in principle to those used for ships are provided also for the fish. Each consists of a large chamber with gate-controlled openings on the downstream and upstream sides. The chambers are filled through conduits, and when in action the entrance gate on the downstream side is first opened to admit water to the bottom of the chamber. The fish enter with it, after which the entrance gate is closed and water is admitted until the chamber is filled. Then the upstream gate, higher up in the walls of the lock, is opened. The fish escape, and they can be urged to move out more quickly by raising a submerged grille that slopes downward towards the gate. These fish locks are built in pairs so that one chamber is always open for the entry of the fish, and each is drained when the fish in it have been pursuaded to leave. The entire process of filling a lock, clearing it of fish and draining it takes about 15 min.

Even this generous provision was not thought sufficient, and an entirely new feature has been introduced in the Bonneville Dam system. A large entrance and a good flow of water are necessary in order to attract the fish, and with this in mind the fishways below the entrances to the ladders and locks have been widened or deepened, or both, while under the extended area diffusing chambers have been built through which an additional flow of water supplied by a conduit system can be admitted at any desired speed. The result is to increase the flow of the fishway from 10 to 15 times, making this the equivalent of a good sized river and ensuring adequate guidance for fish.

There are three sets of fishways, one at each end of the dam and one across the base of the power house, each fishway comprising a collecting system, fish ladders and a pair of fish locks. In addition a special fish ladder intended for the use of descending fish extends from the vicinity of the lock to a creek half a mile below the dam. Fish passing downward can follow special by-passes constructed at the points where they usually assemble, and many of them actually are carried through the turbines of the power-house without injury. Fish-counting stations are installed in the ladders, each consisting of a barrier in which there are special openings 2 ft. wide where the fish making their way upstream pass over submerged white platforms to allow them to be checked and identified.

Experience has shown that there is very little movement of fish at night. Counting therefore is usually limited to the daylight hours. While the run is at its height two or three counting stations in each ladder are operated at the same time. Counts are recorded hourly, and each kind of fish is counted separately.

During an actual count extending over six months more than 362,000 salmon, 106,000 steel head trout, 223,000 lamprey and 382,000 other fish passed up the river.



The spillway dam in the main channel of the Columbia River at Bonneville. The gantry cranes on the crest are used for raising the gates. In front of the dam the lower end of a fish ladder is seen.

For the information given in this article we are indebted to the Bonneville Power Administration, Portland, Oregon.

RAILWAY NEWS

The First Great Central 4-6-0 Engines

In 1904 Mr. J. G. Robinson, Locomotive Superintendent of the former Great Central Railway, had decided that larger express engines than the 4–4–0 classes so far in service were necessary, and in order to compare the merits of the 4–4–2 and 4–6–0 types decided to introduce two new locomotives of each wheel arrangement, similar in dimensions and general design. One of each had cylinders of 19½ in. diameter and the others of 19 in. The 4–6–0 illustrated on this page is the one originally built with the smaller cylinders. In both types driving wheels were 6 ft. 9 in. in diameter, boiler pressure 180 lb. per sq. in. and grate area 26 sq. ft. The "Atlantics" found greater favour for the time, and the present well known series of 4–4–2 engines were turned out during the next few years before a return was made to the gradual construction of the 4–6–0 express and mixed traffic types now classed B2-9.

The two pioneer 4–6–0s still constitute a class by themselves in the L.N.E.R. lists, with the lettering "B1," and as now appearing have a superheater boiler standard with the "C4 Atlantics" and similar to that used on the "04" G.C. 2–8–0 locomotives. They also have L.N.E.R. chimneys, snifting valves and tenders.

L.N.E.R. Locomotive Veterans

Two 4–4–0 engines having typical Worsdell single, long splashers covering the upper portions of large driving wheels, 7 ft. 1 in. in diameter, may still be seen at work in the North Eastern area of the L.N.E.R., bearing the numbers 1621 and 1629. They are two survivors of the former N.E.R. "M1" class built at Gateshead works in 1893, the class originally consisting of 20 locomotives numbered 1620-39. In their early days they were in the front rank of British coupled express engines. They had a heating surface of 1,341 sq. ft., inside cylinders 19 in. in diameter with 26 in. stroke, and boiler pressure of 180 lb. per sq. in.

It is on record that all but one of the class when built had the unusual arrangement of slide valves working in outside steam chests, operated by rocking shafts from Stephenson's link motion, the eccentrics of which were between the cranks on the driving axle. The exception was No. 1639, which was provided with piston valves. Round about 35 years ago, however, though not destined to be superheated, all engines of the class were equipped with piston valves placed normally under the smoke-box and actuated by link motion placed between the frames, as customary on many types of inside-cylinder engines.

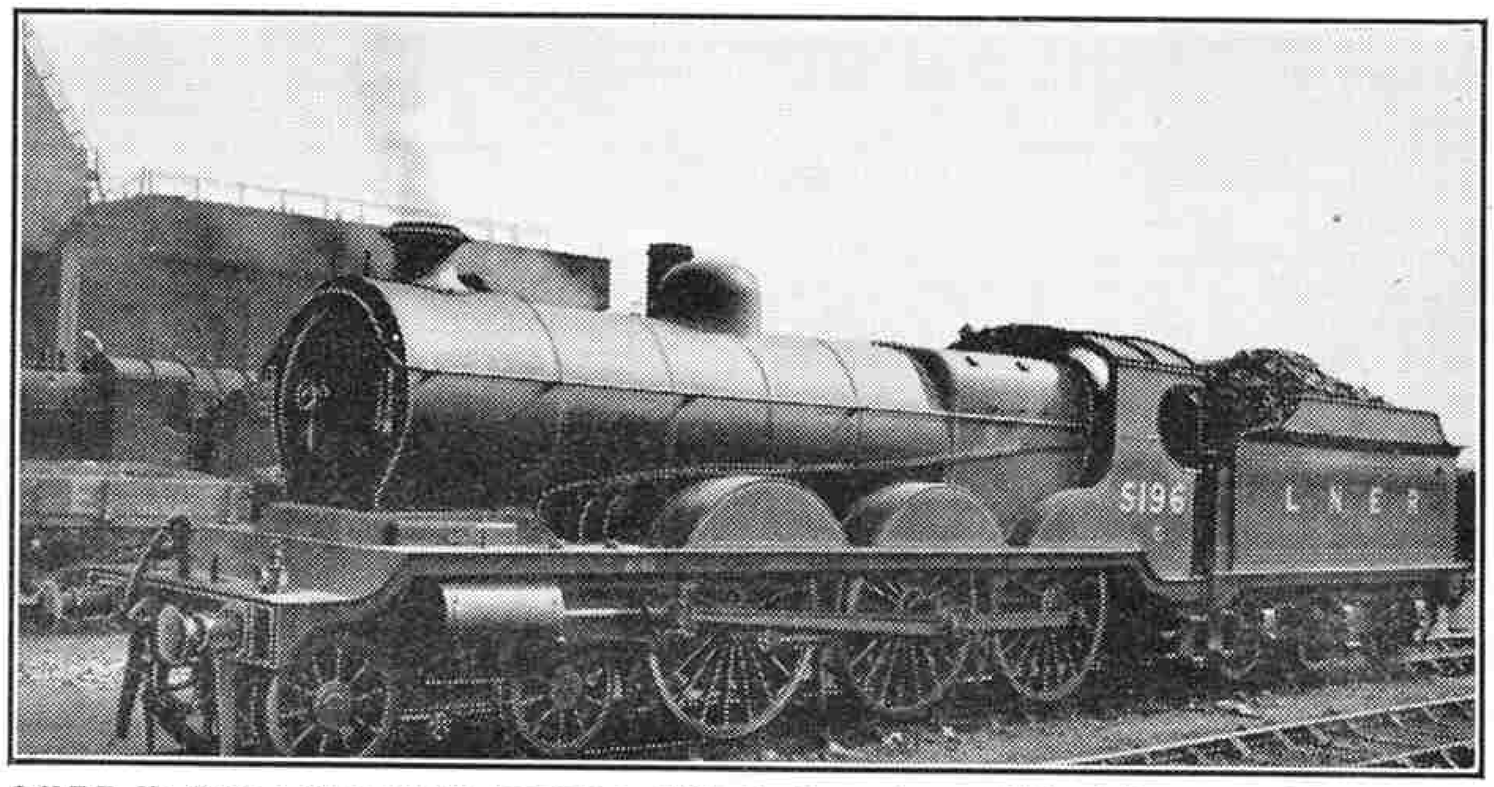
During the race to Aberdeen of 1895, when there was intense competition between the East and West Coast routes and fresh records were being set up nightly, engines of the "1620" class were used regularly between York and Edinburgh. Nos. 1620 and 1621 shared in the working of the final and fastest journey of that astonishing series. With a load of 105 tons No. 1621 once ran from York to Newcastle, 80½ miles, in 78½ min., and No. 1620 then covered the 124½ miles on to Edinburgh in the amazing time of approximately 113 min., start to stop in each case. From contemporary accounts we gather that scant attention was paid to service slacks, and also that the engines steamed excellently. In the L.N.E.R. classification they are "D17/1."

Making Up Lost Time

Some enterprising examples of time recovery by heavily loaded L.M.S. expresses, were recorded during the past summer. On one occasion the midday "*Scotsman*," northbound with a 17-coach train weighing 570 tons, left Crewe 10 min. late hauled by a streamlined 4–6–2 engine. Notwithstanding two signal checks, and a severer slowing near Preston, the train was 1½ min. early past Oxenholme, and after passing over Shap arrived at Carlisle 4¾ min. before time. The schedule for the 141 miles was 182 min., but this distance start to stop was actually covered in 167¼ min., or say 164 min. net. This was equal to some of the best peacetime running although the train was a very heavy one.

Another locomotive of the same class, working the 8.30 a.m. from Euston weighing 585 tons gross, gained 22 min. on the present timings to Crewe. Allowing for delays, the 65¼ miles from Watford to Rugby were covered in 66 min. and the 51 on to Stafford in 50½ min., an average of more than a mile a minute. A "Royal Scot" 4–6–0 with 14 cars regained over 6 min. from London to Crewe on the same train, her time from Watford to Rugby being 69¾ min. These again were start to stop runs, and the grading is comparatively easy.

Along the level or slightly falling stretch of the Midland main line between Leicester and Trent Junction standard "4F" 2–6–0 No. 2825 put up a most dashing performance with a relief passenger train weighing about 350 tons full. With No. 2825 attaining a steady 65-66 m.p.h. Sileby, 7¾ miles, was passed in 9¼ min., and the next 10 miles were covered in 9 min. with a maximum of 72. Even time was just being attained when adverse signals compelled a slowing, but even so the train was at rest in Trent station in 22 min. 3 sec. for 21¼ miles. Five minutes had been recovered from a 27 min. booking.



L.N.E.R. No. 5196, a former G.C.R. locomotive. Originally its number was 196 and it was one of the two 4-6-0 express engines built in 1904, as explained on this page. Photograph by J. Sturt.

Third Class Only in the London Area

By order of the Minister of War Transport, all steam and electric services operating in the inner and outer London suburban areas became "Third Class Only" on 6th October. This change was made to save labour and to provide the maximum seating capacity during rush hours.

The region covered by the new arrangement extends roughly to 30-35 miles in all directions from Central London. As many of the suburban trains on all lines are made up into standard sets of vehicles, which are never separated except when heavy repair is needed, the first class compartments continue to run but now are available to all passengers. The figure "3" will appear against the trains concerned in the time-tables, and also on platform indicators, to indicate that they are one class only as regards ticket arrangements.

In certain cases long-distance and country trains, which continue to provide first and third class accommodation, stop at some stations within the London zone.

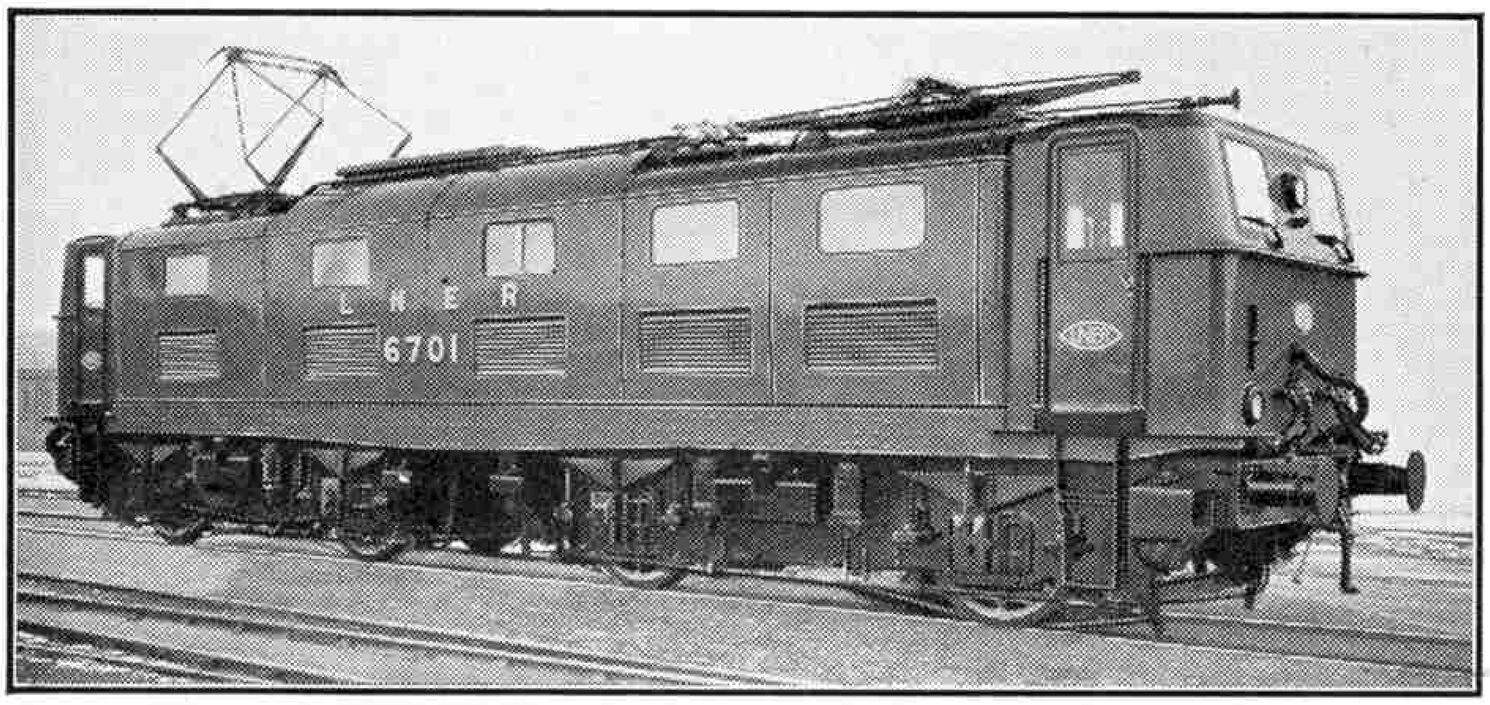
* * * *

In the United States are 43 railways that have more than 1,000 miles of track each.

Disappearing L.M.S. Locomotive Classes

In reference to our recent paragraphs on the L.M.S. "Claughtons," we are now officially informed that the only one now in service is No. 6004 "*Princess Louise*," a rebuild.

The 4-6-4 "Baltic" passenger tanks, the first class built by Mr. G. Hughes when he became Chief Locomotive Engineer of the L.M.S. on grouping, also is nearly extinct. The only one now left is No. 11110.



The new L.N.E.R. locomotive No. 6701 which recently completed successful trials on the Manchester, South Junction and Altrincham Railway. This locomotive is intended for use on the Manchester-Sheffield line when this is electrified. Photograph by courtesy of the L.N.E.R.

Successful Trials of L.N.E.R. Electric Locomotive

As announced in our April issue, work on the electrification of the Manchester-Sheffield line of the L.N.E.R. was suspended on the outbreak of war. The construction of the electric locomotives for use on the line also was stopped, but the first of these, No. 6701, was so far advanced that it was completed to make it available for trial purposes. Tests have now been carried out with in on the Manchester, South Junction and Altrincham Railway, on which direct current at 1,500 v. supplied from overhead wires is used, exactly as in the projected scheme for the L.N.E.R. electrification.

The trials were made with both goods and passenger trains and were very successful. A speed of 64 m.p.h. was reached on one run of 5½ miles with a train of seven corridor coaches weighing 250 tons, and 60 m.p.h. was attained on the return trip, although a signal stop was made. On another run with a trailing load of 273 tons 60 m.p.h. was reached in three minutes from the start, and 36 m.p.h. was reached with a total load of 700 tons.

A photograph of the new locomotive is reproduced on this page. It is fitted with four motors with a total of 1,860 h.p. and is designed to haul an express passenger train at 65 m.p.h. on the level, or a goods train of 500 tons at 40 m.p.h. on an incline of 1 in 125. The speed with which it can pull a 700-ton train on the same gradient is 26 m.p.h. Current is collected from the 1,500 v. overhead line by means of either of two pantographs. There is a roomy driver's cab at each end, with an unobstructed view from the front window, which is provided with an automatic wiper. The controls are electrically operated by means of 50 v. circuits, current for which is supplied by a special 5 kW. motor generator set. If this should fail ample current for control purposes and for lighting is provided by a battery of 33 nickel-iron accumulators. An electrically heated boiler with a capacity of 750 lb. of steam per hour is installed to provide steam for heating passenger trains hauled by the locomotive.

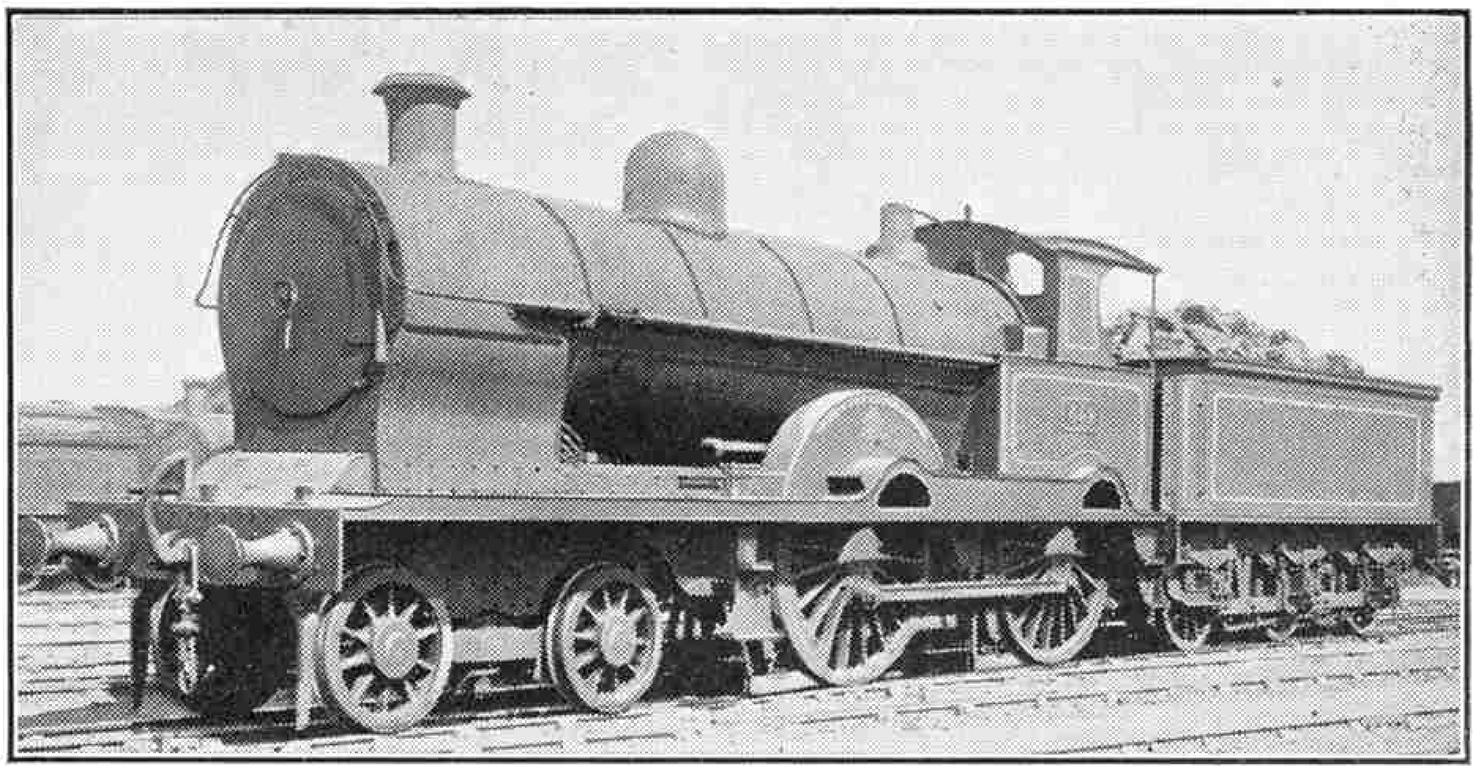
An interesting feature is a special switch for use on starting, when the pull on the train causes a transference of weight from the leading axle of each bogie to the rear one. The effect of the switch is to weaken the field of the leading motors of the bogies, and thus to prevent the wheel slip that would follow on the loss of adhesion.

A L.P.T.B. Steam Express

One usually associates the recently consolidated L.P.T.B. railway service with urban electric trains making frequent stops. By virtue of its ownership of the former Metropolitan Railway, which possessed an important route stretching out from Baker Street to Aylesbury and Verney Junc., the Board recently operated, among passenger trains which are steam hauled in the country sections of this route, a fast southbound morning residential train that started from Aylesbury and carried express head lights! The engine was one of the large 4–4–4Ts built for the Metropolitan in 1920, with 5 ft. 9 in. driving wheels and outside cylinders. These engines now form L.N.E.R. class "H2," numbered 6415-22. Speeds up to 75 m.p.h. were attained down the steeply inclined Chorley Wood bank, in the course of the longest non-stop run ever scheduled on Metropolitan metals, 19½ miles.

In November 1937 the principal Metropolitan steam locomotives were taken over for operating purposes by the L.N.E.R., and by that time an additional stop had been inserted at Rickmansworth. Before the war non-stop electric runs were made between Rickmansworth and Baker St., 17¼ miles, but the 15¼ miles between Baker Street and Moor Park is now the longest.

The Pullmans *"Mayflower"* and *"Galatea,"* which for years ran in certain trains to and from Aldgate, Baker St. and Outer suburban stations, have been broken up.



L.M.S. 4-4-0 "Precursor" class No. 659 "Dreadnought," as appearing in former L. & N.W. colours.

KENYA AND UGANDA RAILWAYS

The Government railways serving this important British African territory are built to the somewhat narrow gauge of 1m. or 3 ft. 3⅜ in. They now extend to 1,625 route miles, radiating from Mombasa, Kisumu, Nairobi and Kampala. Construction is largely modern and was costly in the extreme on account of the tropical and mountainous country traversed. At one point near the Equator an altitude of 9,130 ft. is attained, the highest railway level in the British Empire.

Gradients on the Mombasa-Kisumu route average 1 in 33-50 for 90 miles, and 1 in 50-100 for no less than 219 miles. Extensive use is made of up to date Beyer-Garratt articulated engines of the 4–8–2—2–8–4 or 4–8–4—4–8–4 wheel arrangements, which provide enormous power although the maximum weight on any one axle is comparatively small It is interesting to note that the orthodox 2–8–2 locomotives, with one set of cylinders each 21½ in. diam. and of 28 in. stroke, hitherto employed on the heaviest duties form one of the most powerful types in the world built for the metre gauge.

Large quantities of maize, coffee, oil seeds, cotton and other products are regularly conveyed in addition to passenger and general traffic.

THE TRANS-SAHARAN RAILWAY SCHEMES REVIVED

There have long been projects under consideration for railways in the French Colonial Empire by means of which connection could be effected between Algeria or Morocco, in North Africa, and Senegal, the Ivory coast or other areas of French West Africa. These would include a plan for a line to the important port of Dakar, on the Atlantic seaboard, towards which the Germans cast envious eyes. It is probably under Nazi influence that the Vichy Government is reviving the explorations, and is undertaking certain extensions of metre or standard gauge railways which now exist near the coasts to be ultimately connected.

The latest schemes include the construction of some 1,250 miles of new standard gauge line across the Saharan desert. The hot climate and stretches of waterless country up to 500 miles across will entail considerable operating as well as constructional problems. It is proposed to use large twin Diesel-electric locomotives of large oil-carrying capacity. These would be somewhat on the lines of two 4,400 h.p. machines which were built experimentally by the former P.L.M. Railway in 1937.

OIL-FIRED "PACIFIC" LOCOMOTIVES IN IRAQ

Four powerful streamlined 4–6–2 locomotives have recently been placed in service on the Iraq State Railway for express passenger service at moderate speeds over the 330-mile route between Tel Kotchek and Baghdad. The total weight of engine and tender is 159 tons, but in order to meet local civil engineering requirements the maximum load on any one axle is not more than 17½ tons.

There are two outside cylinders of 21 in. diameter and 26 in. stroke; the boiler pressure is 220 lb. per sq. in., driving wheels 5 ft. 9 in. trailing truck 3 ft. 9 in., and bogie and tender wheels 3 ft. 3½ in. Walschaerts gear actuates steam distribution through piston valves of liberal dimensions, and the firebox is specially designed for burning oil fuel on the trough system. The use of this fuel is natural, for Iraq is an important oil producing country, over which Great Britain has recently taken partial control for defence reasons.

* * * *

The southernmost L.M.S. locomotive shed is situated at Bournemouth. This is more than 800 miles from the company's northernmost motive power depot, in the far north of Scotland, and is actually on S.R. territory. It is used by engines working from the Bournemouth end of the Somerset and Dorset Joint system, which is mainly L.M.S. operated.

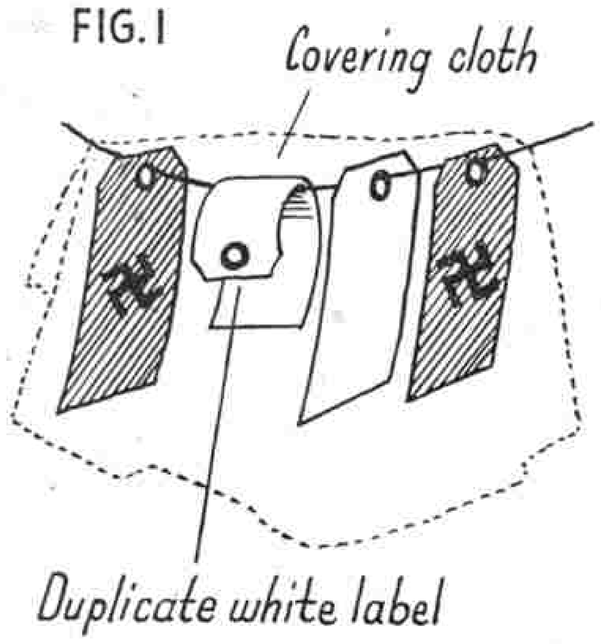
Easy Magic for the Christmas Party

By Norman Hunter (From Maskelyne's Mysteries)

BEFORE I begin to describe my tricks for Christmas, let me just remind you once again to try the tricks a few times in private before you let them off in front of an audience, because the easiest trick needs a few rehearsals. Another point—make your little entertainment amusing as well as mystifying by cracking a few jokes as you go along.

Now we will haul up the curtain and begin with a topical sort of trick!

FIG. 1

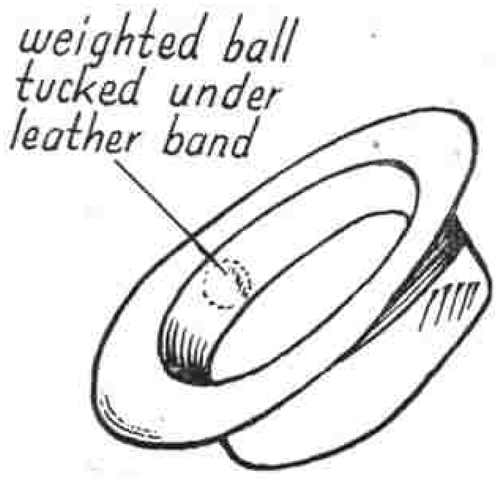


FOOLING THE NAZIS

You show a length of thin cord and two tie-on luggage labels. The labels have been painted red and each has a black swastika drawn on it. There is also a white label. When these things have been examined you thread them on the cord, the white label being between the two red ones.

"This is the story of a British prisoner of war," you say. "Here he is in the prison camp with a guard at each side of him." You get two people from your audience to hold the ends of the cord, and you then throw a large handkerchief over the labels. "During the blackout one night," you go on, "the British prisoner escaped. There was no lag in his off from the Oflag you see, here he is free and unharmed." You put your hand under the handkerchief and take out the white label whole and undamaged. Then you whip

FIG. 2



off the cloth and the two Nazi labels are still threaded on the cord, but of course the prisoner has gone. "I now leave the Gestapo to investigate everything," you say, with a wave of your hands to your two assistants.

The secret. Very simple, but very puzzling to the audience. There is a second white label. Have this in your pocket and get it secretly into your right hand while you are talking, by casually putting your hand in your pocket. When you put the cloth over the cord, lay the extra label over the cord. The cloth will keep it there. Now show both hands empty, reach under the cloth and quietly tear off the white label. Conceal the pieces in your hand and bring out the duplicate white label. See Fig. 1. You can now safely leave your assistants to examine the cord and labels.

RADIOLOCATION

Of course it is nothing of the kind, but this makes a very up-to-date setting for a good trick. You begin by showing about 20 small squares of thin paper, about 3 in. square will do. All except one are blank, but one has a message on it. A simple phrase such as "Work hard for Victory," or "Save fuel," will do. You hand the papers to members of the audience and ask them to roll each paper into a loose ball and drop them into a hat.

"My job is to locate the message," you say, "and to do it I use a special sort of radiolocation of my own." You show your hand empty, take a ball from the hat and unroll it. Sure enough it is the one with the message.

The secret. Have an extra square of paper with the same message written on it. Screw this into a loose ball with a little marble inside and tuck it under the leather band of the hat. When the papers have been dropped into the hat it is a simple matter to lift the leather band slightly and let the weighted ball drop in with the others. The papers can now be well shaken up but you can easily find the prepared one by its weight. Conceal the little marble as you open the paper. It is not necessary to show the rest of the papers after the trick, because even if the audience were to suspect the presence of another message paper, which is most unlikely, they would still have no clue to the mystery of how you located it among the others.

THE CHIG AND PICKEN

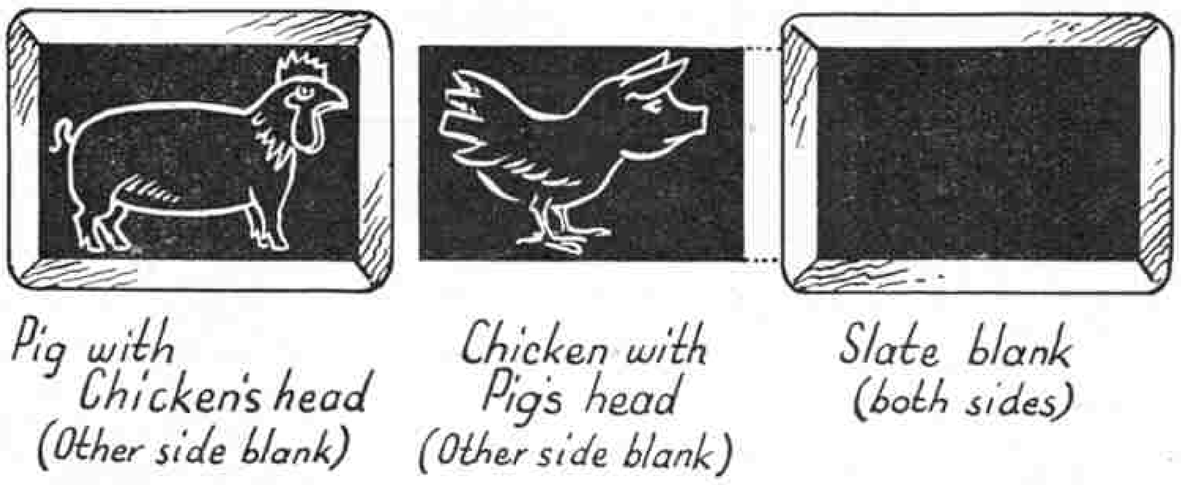
Sounds like the name of an inn that's got a bit mixed! The trick is done with two small slates. On one you draw in white chalk a picture of a pig and on the other a picture of a chicken. "In these days of rationing and registrations little mistakes are apt to occur now and again," you say. You place the slates together as you speak, then separate them again. To everybody's amusement the picture of the pig now has a chicken's head instead of its own, and the pig's head is on the chicken. "Dear me," you say, "I wonder what Lord Woolton would think about that."

The secret. The slates are unprepared, but there is a piece of thin card, painted dead black on both sides, that will fit snugly but loosely within the frame of either slate, completely covering the slate. If the slates are those made of black cardboard the loose flap will match perfectly, but if you have to use real slates it is as well to paint them with dead black paint.

Prepare the trick by drawing on one slate a picture of a pig with a chicken's head, then draw a chicken with a pig's head on one side of the flap, as shown in Fig. 3. If you are no better at drawing animals than I am, you can trace down suitable parts of pictures from a book or magazine.

Place the flap picture side down on the slate that has the drawing on it. The slate can then be shown to be blank on both sides by keeping the flap in position with your fingers. Now to perform. Show the prepared slate and on the flap draw a pig, complete with pig's head. If you are no

FIG. 3

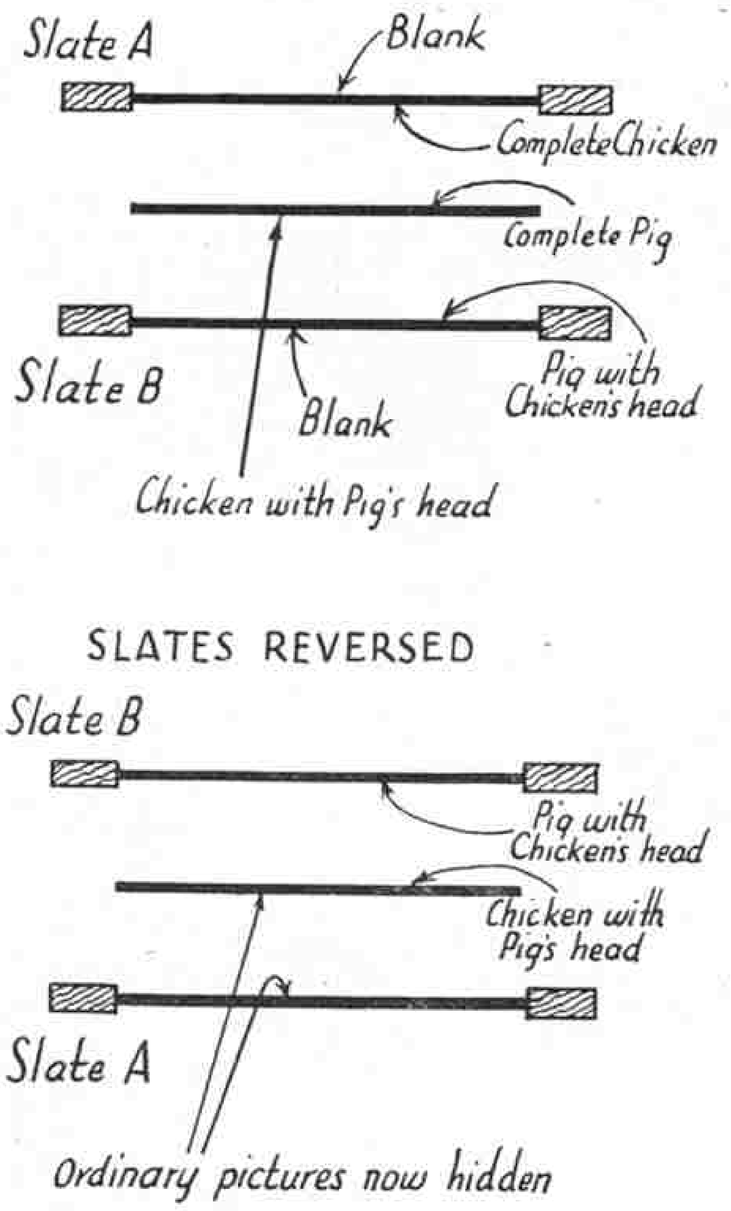


artist you can have the drawing outlined in pencil, which will not be visible to the audience but will give you sufficient guide. Now draw a complete chicken on the other slate and put the slates together picture to picture, with the flap slate underneath. As you talk, turn the slates over. When you again separate them do so by lifting off what is now the top slate, and which of course has the pig with the chicken's head on it. The flap will be left on the other slate, covering the picture and revealing the chicken with pig's head. Fig. 4 will make everything clear.

PASS THE NAPKIN

You begin the trick by showing two paper napkins, one in each hand. "Will someone please choose one of these colours," you say. Somebody, we will imagine, chooses green. You crumple the green napkin loosely into a ball and drop it into a tumbler. You then roll the other napkin, say a red one, in your hands and it vanishes. Opening the green napkin you find the

FIG. 4

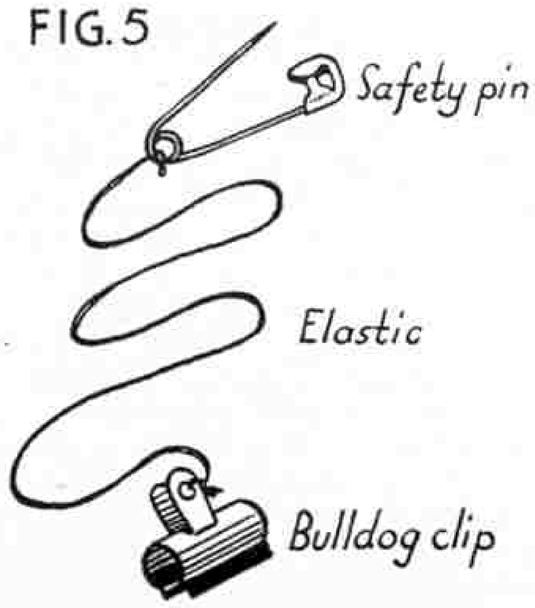


vanished red one inside it.

The secret. There are two red napkins and one green one. One red napkin is rolled into a small ball and you hold it behind the corner of the green napkin that you are showing. Your fingers will easily hide the ball, so the napkin can be shown on both sides. It does not matter which colour is chosen. If green, you crumple the green napkin, first laying down the red one. Bring your hand over the green napkin and crumple it loosely round the hidden red one, then put the parcel into the tumbler. If red is chosen, simply lay it down and say "Then we shall not want the green one, so I'll just pop it into this glass."

Now to make the red napkin vanish. In Fig. 5 you will see a queer-looking appliance consisting of a length of elastic with a safety pin at one end and a bulldog clip at the other. Fix the safety pin to your trousers on the left side, just under the edge of your waistcoat. Carry the elastic round your waist, tuck it through the strap on the back of your trousers, stretch the elastic and attach the clip to the edge

FIG. 5



of your waistcoat on the right side. Having put the green napkin into the glass, turn to pick up the red napkin, which should be on your right. Pick it up with your left hand, while with the right you get hold of the clip, release it from your waistcoat, and keep it concealed in your right hand. Turn with your right side to the audience and crumple the red napkin into a compact ball. Attach the clip to it, make a throwing movement with your hands, and let go of the clip as your hands come down for the throw. The elastic will whisk the red napkin out of sight, and if you follow the imaginary flight of the paper into the air with your eyes, your audience will instinctively do the same. The effect is quite startling, the ball seeming to vanish in mid air. See Fig. 6.

And now to finish up with here is another topical sort of trick which I have called:

FOR REGISTERED CUSTOMERS ONLY

This is a sort of story with conjuring illustrations. You show the audience three large tins or boxes each labelled with the name of a house. One is *"The Grange,"* another bears the title *"Homeleigh,"* and the third is called simply *"No. 24."* "These are the homes of three registered customers," you explain. "They were all registered with the same tradesman for different things. *"The Grange"* was registered for tea, *"Homeleigh"* for sugar, and *"No. 24"* for butter." After showing that the tins are empty and ordinary, you illustrate this part of the tale by putting a

FIG. 6



pound of tea into the tin labelled *"The Grange,"* a pound of sugar into *"Homeleigh"* and a pound of butter into *"No. 24."* Of course the articles are dummies. An empty tea packet filled up with sawdust, for instance, a sugar bag filled with sand, and a block of wood painted yellow and done up in grease-proof paper for the butter.

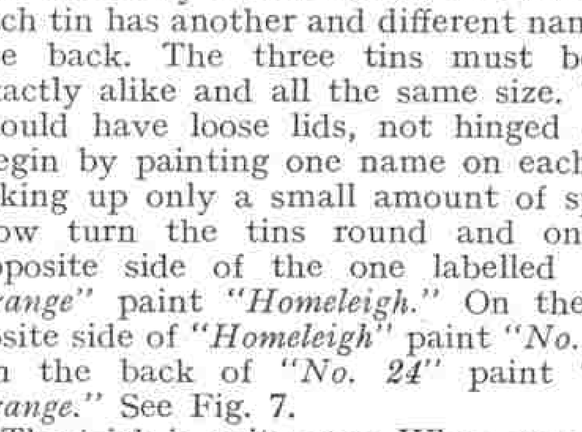
So that the audience can remember where the things are you write them down on a small blackboard or piece of card and leave it in full view thus:

"The Grange" ..... TEA
"Homeleigh" ... SUGAR
"No. 24" ... ... BUTTER

"In due course the rations were delivered," you explain. "But then some organising took place." You throw a cloth over the tins as they stand in a row on a tray and carry the tray over to another table while you go on with the story. "The people at *"The Grange"* never drank tea but they were frightfully keen on butter, so they did a deal with *"No. 24"* where the folk didn't care for butter but loved sugar. They in turn made arrangements with *"Homeleigh"* who had no use for sugar but always enjoyed a nice cup of tea as often as possible. So the final result was that:

"The Grange" had the BUTTER.
"Homeleigh" got the TEA,
and
"No. 24" became the proud owners of the SUGAR.

FIG. 7

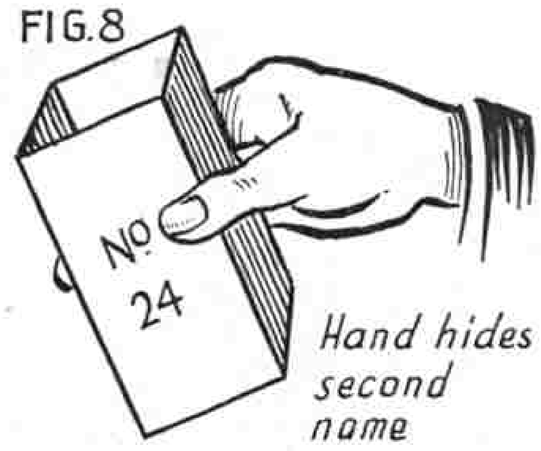


As you say this you take the cover off the tins and from the different receptacles you take out the articles as you name them. Everything has magically changed round.

The secret. In case you are beginning to think of highly mechanical boxes with five false bottoms each, let me tell you that the tins are quite ordinary and that there is only one of each of the articles of food. The dastardly secret lies in the fact that each tin has another and different name on the back. The three tins must be all exactly alike and all the same size. They should have loose lids, not hinged ones. Begin by painting one name on each tin, taking up only a small amount of space. Now turn the tins round and on the opposite side of the one labelled *"The Grange"* paint *"Homeleigh."* On the opposite side of *"Homeleigh"* paint *"No. 24."* On the back of *"No. 24"* paint *"The Grange."* See Fig. 7.

The trick is quite easy. When you show the tins in the first place your hand will naturally cover the second name, as shown in Fig. 8. Put the various things into the tins and throw a cloth over them. Pick up the tray on which the tins stand. Do this

FIG. 8



by grasping the front edge of the tray. Carry the tray to the other table but go behind the table and face the audience as you put the tray down. This turns the tray right round in a manner that rouses no suspicion. All you have now to do is to take off the cloth, open the tins and, owing to the fact that the names have been changed by turning the tins round, the contents will appear to have changed places. To prevent any member of the audience from memorising the order of the tins and noticing that they have changed, place them one slightly in front of the other so that the names are partly hidden, not in a perfectly straight row.

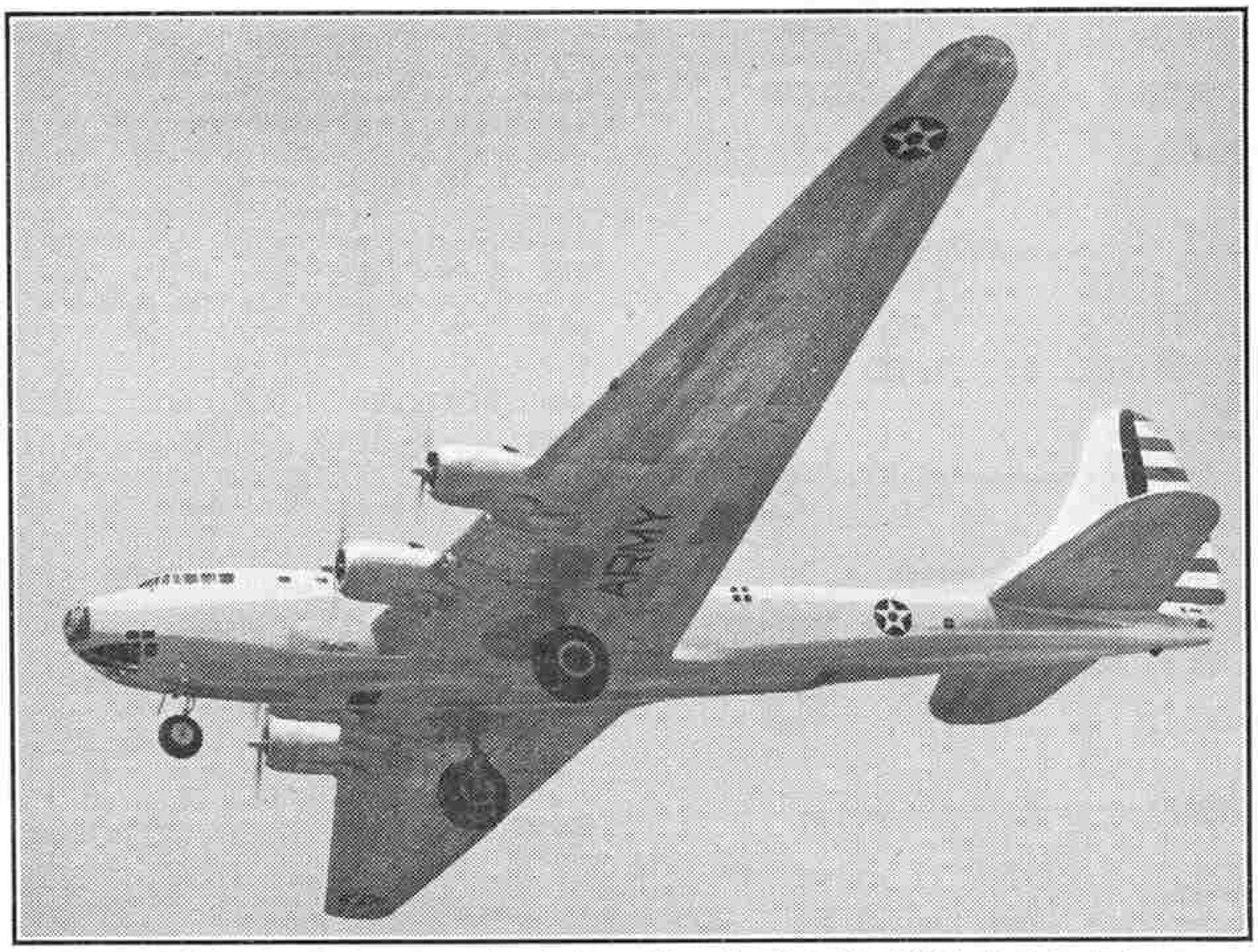
The World's Largest Aeroplane

Flying Laboratory for U.S. Army Air Corps

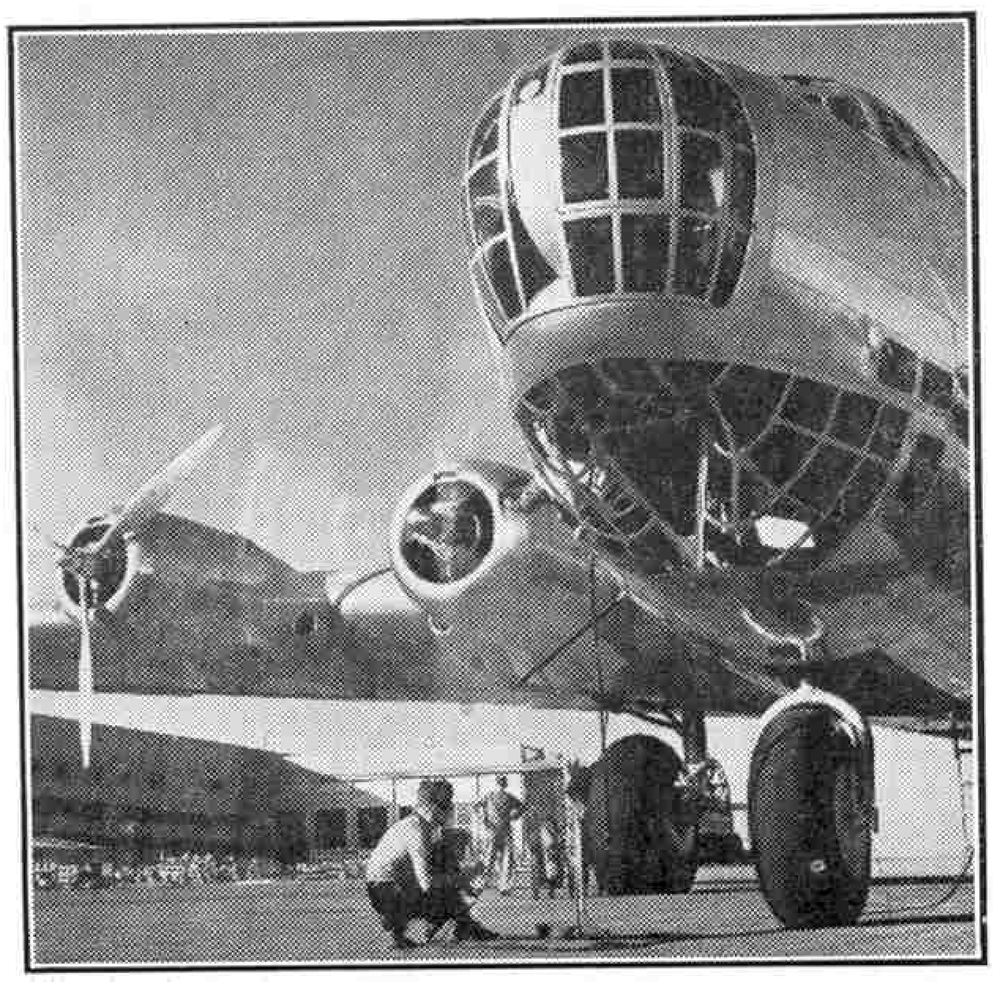
THE largest aeroplane in the world, the Douglas B-19 bomber, made its first flight on 19th June last, and is now undergoing the most thorough testing in the air ever given to a new aeroplane. Eventually it will be delivered to the United States Army Air Corps, who will use it as a flying laboratory for assembling and checking technical information. It will serve also as a guide in the design and construction of great air freight and troop transports of the future. In addition to being the world's largest aeroplane, it is claimed to have the greatest load carrying capacity, longest range, and the most powerful armament of all aircraft. Armed with machine guns and cannon, and carrying 18 tons of bombs, it is a veritable aerial dreadnought.

A good impression of the great size of the machine can be gathered from the photographs on this page. It has a wing span of 212 ft., roughly equal to the height of a 20-storey building, and its tail unit is 61 ft. across. When resting on its three landing wheels it is 42 ft. 9 in. high to the top of the rudder. The four Wright "Duplex-Cyclone" engines mounted in its wings develop a total of at least 8,000 h.p. and drive 16 ft. three-bladed airscrews. It has been designed to have a long range and great striking power rather than high speed, and to be able to fly above the effective range of anti-aircraft guns. With the maximum fuel load on board it can fly non-stop a distance of 7,500 miles. This range is said to be three times greater than that of the destroyers used by the United States Navy in the war of 1914-18.

The normal operating or flight crew of this air giant totals 10 men, six of whom—the commander, pilot, second pilot, navigator, radio operator, and flight engineer—are located on an upper deck in the forward part of the fuselage. The other four are a chief mechanic and three relief crew members. Accommodation for the crew includes a galley and wardroom, and a cabin with sleeping facilities for eight men on full-length berths. These berths are a necessity, as on long flights the bomber may remain in the air for more than 48 hrs. For combatant duties the machine's battle stations can be manned by a fighting crew, in addition to the flight crew, and it is estimated that if equipped as a troop transport the machine can carry 125 fully-armed soldiers.



The Douglas B-19 bomber, the largest aeroplane in the world, making its first test flight. Photographs by courtesy of the Douglas Aircraft Company, Inc., U.S.A.



The great height of the machine is well brought out in this view of the fuselage nose and landing gear.

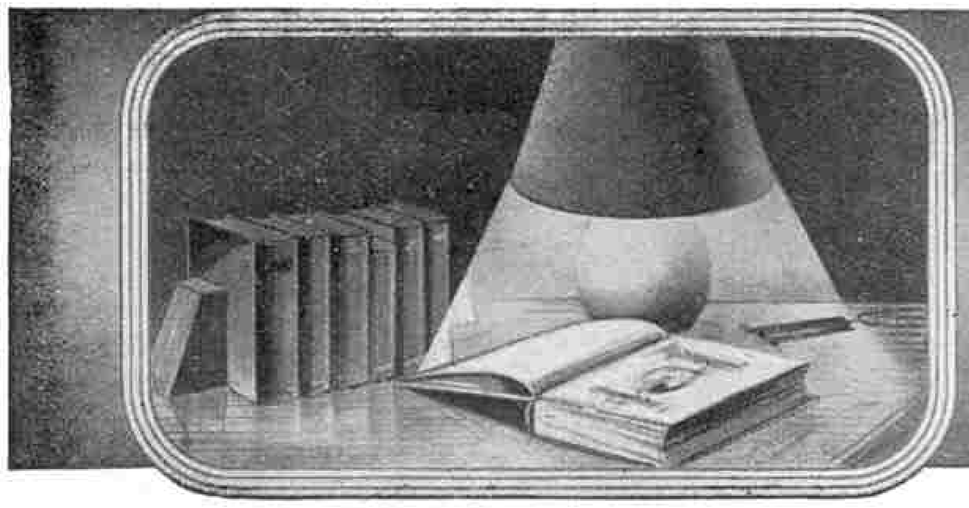
The contract for the construction of the Douglas B-19 was signed in 1937. From then until nearly completed production of the machine went on behind huge, closely-guarded canvas curtains hung from roof trusses in the vast final-assembly hangar of the Douglas factory. The construction was accomplished by a group of picked workers sworn to secrecy, and their occupation was known to their fellow employees only as "Project D." Eventually there came the thrilling day when the military authorities sanctioned the lowering of the curtains, and the "hush-hush" job stood revealed as the world's largest aeroplane.

The construction of the B-19 bomber set the Douglas engineers and craftsmen many difficult problems, but they were helped greatly by the experience gained in producing the DC-4 air liner.

The B-19 is so huge that a technique new to the aircraft industry had to be devised for its assembly. The wing and fuselage centre section were assembled in one piece in a vertical position in an elaborate cradle or jig built of riveted structural steel and weighing over 100,000 lb. This jig was more than 48 ft. high and had seven working levels along its face, each equipped with work benches and lined with electric power and compressed air outlets for the tools.

When finished the huge wing had to be lifted from its cradle and turned into a horizontal position for splicing to the fuselage nose and tail sections, which were assembled near by and in the normal horizontal position. Lead weights totalling 68,000 lb., and double the weight of the wing and its accompanying fuselage section, were suspended by cable from the roof to test adequately in advance the rafters of the hangar. For the actual lifting operation two electric winches were connected by cables running through pulleys in the rafters, and half of the steel jig was cut away. Then with engineers stationed at strategic points to ensure that everything went smoothly, the signal was given and the winches thrown into gear. Moving almost imperceptibly the giant wing structure rose from its jig, and was turned into a horizontal position and gently lowered into place between the nose and tail sections of the fuselage. The whole operation was completed within 5 hrs., and so correct were the preliminary calculations and arrangements that none of the three sections had to be re-aligned for joining.

The fuselage is 132 ft. long and the two main landing wheels of the retractable tricycle undercarriage are 8 ft. 4 in. in diam. The nose wheel is 4 ft. 6 in. in diameter.



BOOKS to READ

Here we review books of interest and of use to readers of the "M.M." With the exception of those issued by the Scientific and Children's Book Clubs, which are available only to members, we can supply copies of these books to readers who cannot obtain them through the usual channels. Order from Book Dept., Meccano Limited, Binns Road, Liverpool 13, adding 1/- for postage to the price. Postage on different books varies, but any balance remaining will be refunded.

"A Book of Trains"

By W. J. Bassett-Lowke and F. E. Courtney
(Penguin Books Ltd. 6d.)

Young readers who want to know how railways began and how trains are run cannot do better than read this excellent Puffin Picture Book. Mr. W. J. Bassett-Lowke is an expert on railways, both real and model, so that the information he gives is well selected and accurate; and Mr. Courtney's pictures are a great help in explaining railway matters. In the book we read how roads and wheeled traffic began and how the steam locomotive was invented. The story of George Stephenson's *"Rocket"* is told, and then we see how engines have improved since the time of that great pioneer. Stations, signals, track, the carriage of mail and many other railway features, including great bridges, are well explained, and there are sections dealing with railways below ground and in the air, famous trains, and miniature railways. A delightful little book.

"Engineering Workshop Manual"

By E. Pull (Technical Press. 5/- net)

This is the ninth edition of this invaluable manual, of which over 100,000 copies have been sold since it was first published. We reviewed the 8th edition in our October issue, and the contents of that have now been supplemented by chapters on lining out and fitting, keys and key fitting, the milling of bearings and the fitting of bearing brasses. It is not surprising to learn that many large firms are using the book as a basis for training, for both engineering beginners and munition workers, for with its 228 illustrations and many useful tables it makes a very complete and reliable guide to workshop practice.

"U.S.S.R. Air Fleet"

By J. Stroud
(Rolls House Publishing Co. Ltd. Price 6d.)

The splendid defence of Soviet Russia against the invader and the great part played in the fight by her gallant and efficient Air Force make the publication of this chart very timely. On one side it gives three-view drawings of 30 types of aircraft in service in Soviet Russia, and on the reverse is a list of over 50 U.S.S.R. aircraft, with dimensional and other details. Brief accounts of the 30 types dealt with in the three-view drawings also are provided, and there is interesting information on the colour schemes, national marking and code letters of U.S.S.R. machines. The whole forms a useful survey of Russian aircraft.

"Dick Seaman"

By Prince Chula
(G. T. Foulis and Co. Ltd. 8/6 net)

Dick Seaman was perhaps the greatest road racing driver that this country has ever produced, and the story of his brief and wonderful career as a racing motorist could scarcely be better told than by Prince Chula. With "B. Bira," his cousin, the author has been closely associated with motor racing in this country and abroad for many years, and he needs no introduction to readers of the *"M.M.,"* to which he has contributed fine articles on the sport.

Seaman lived for motor racing, and in this volume we see how his love for it grew while he was still a boy, and later at Cambridge, where he devoted all his spare time to his cars. When he left Cambridge he plunged straight into the sport, in which he could see a fine career; and he had not long to wait for his first success, which came in his fourth long-distance race at Berne, in Switzerland. He went on from one triumph to another, and it is thrilling to read Prince Chula's first-hand accounts of race after race. His greatest triumph was his success in the German Grand Prix of 1938 at the Nürburg Ring, for up to that time only two foreign drivers had beaten the Germans on their own ground. It was not only natural genius for racing that brought Seaman his victories; he studied photographs and cinematograph films incessantly to discover means of improving on his methods.

Then came tragedy. While leading in the Belgian Grand Prix at Spa, a race run in pouring rain that made the roads wet and slippery, his car went into a terrible skid at a turn, ran into a tree and burst into flames. Seaman was stunned, so that he was unable to get out, and he was so badly burned that recovery was impossible.

Every detail of the magnificent career thus brought to an untimely end is given by Prince Chula, who not only describes every race but also takes us behind the scenes and enables us to realise to the full that Seaman, in his own words, "tackled the job properly and thoroughly deserved all his success." The fine photographs reproduced as full page illustrations are a specially attractive feature of the book, which is a fine addition to the literature of motoring and motor racing.

Owing to difficulties that have arisen as the result of war conditions it is impossible to guarantee the immediate delivery of books ordered in accordance with the scheme explained at the head of the first column on this page. For this reason readers who order books must be prepared for some delay, but every effort will be made to ensure speedy despatch.

"The Trumpeter of St. George"

(Harrap. 1/6)

This booklet is issued by the publishers in association with the Royal Society of St. George. It originated in an engraving made 16 years ago by Stephen Gooden, A.R.A., of a trumpeter mounted on a lion blowing "a silver-throated summons" to the waiting world below him. Mr. Rostrevor-Hamilton discovered in it something symbolic that he has explained in very fine verse. The trumpet call is interpreted as a challenge to all of us to maintain freedom in heart and soul, at whatever cost, and so to make our war-ravaged earth into a place of joy. The engraving is excellently reproduced as a frontispiece and on the cover of this finely printed pamphlet.

"Introducing Charles Dickens"

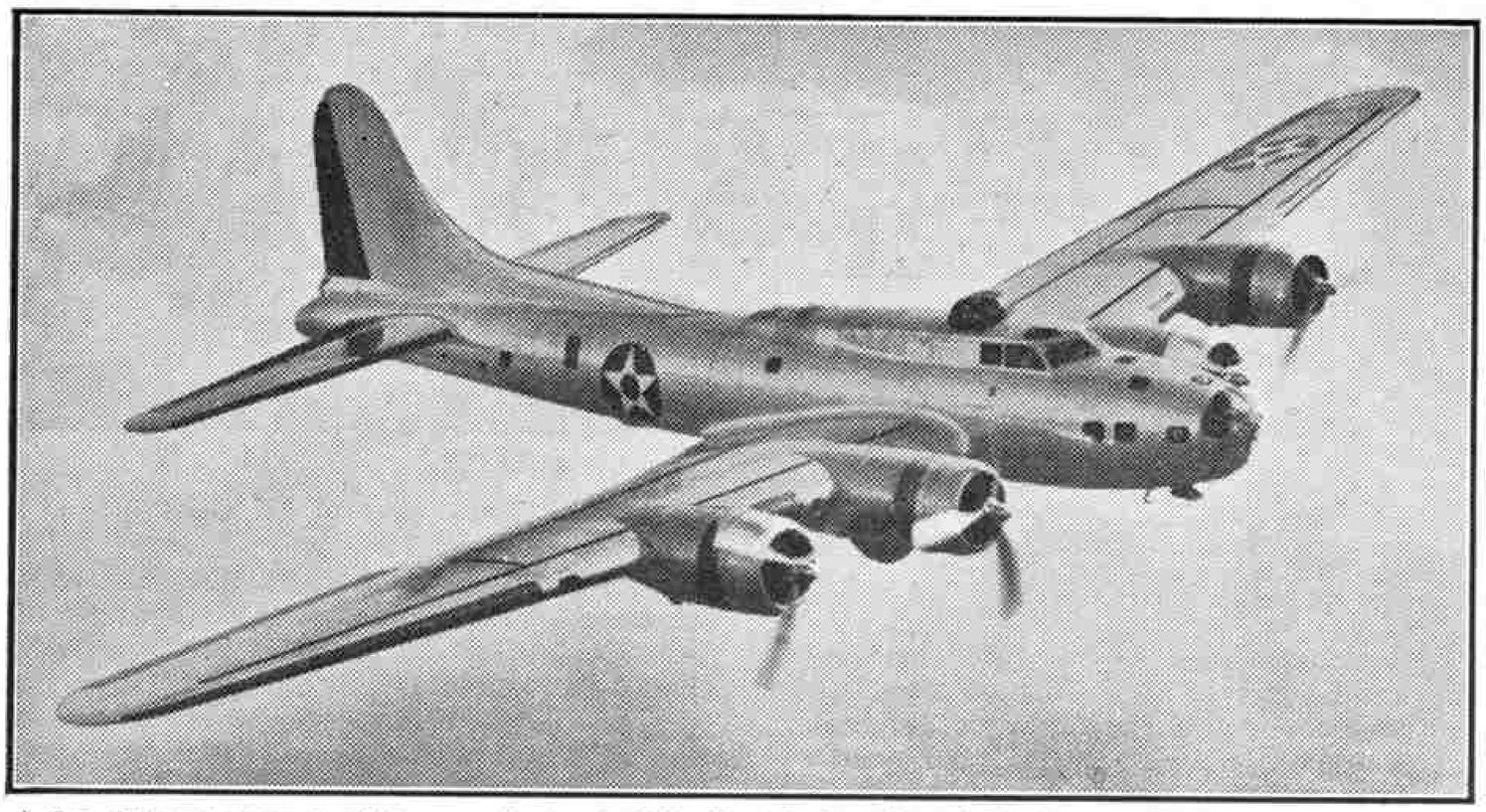
By May Lamberton Becker
(Harrap. 10/6 net)

The right time of the year for boys and girls to be thinking about Dickens undoubtedly is Christmas, the season of goodwill and jollity about which he has written so finely in *"A Christmas Carol"* and elsewhere. Here is a book that will help them to know the creator of Sam Weller and Pickwick, Little Nell, Oliver Twist and a great host of others whom most of us know well enough to look on them as friends. It is a book that helps in other ways too, for royalties on it are being given to the *"Cratchit Fund"* for the relief of *"Little Londoners"* and families in shelters, and the American royalties have provided the Red Cross Ambulance named *"Charles Dickens"* that is now at work in London.

The book is rightly named *"Introducing Charles Dickens,"* for in it we meet Dickens himself, instead of merely reading an account of his life. We see him as a boy, an odd little figure with large dark blue eyes that revealed in some measure the original and unusual power that he was to show. We follow him from one house to another in London as the family fortunes fade away, and picture him in a dingy corner of a warehouse down by the Thames, pasting labels on pots of blacking, or in the debtor's prison that claimed his genial father. By then we know that nothing can hold the boy back, and are not surprised when he eventually emerges as a star reporter, full of life and vigour, and as a great story teller.

So throughout the book we go on from triumph to triumph until we reach his last unfinished story, written in the home that he created for himself in fulfilment of a boyhood dream. Then we realise how much of Dickens himself there is in his books, with their wide humanity and their fiery indignation against wrong. In the author's own words "a ruthless genius used him .... and left him. But it also left his novels."

The book is well illustrated by 15 full page plates and many line illustrations.



A fine flight photograph of the new Boeing B-17E, the latest version of the famous "Flying Fortress" heavy bomber. This photograph and the upper one on the next page are by courtesy of the Boeing Aircraft Company, U.S.A.

AIR NEWS

The Blackburn "Botha"

The chief output of Blackburn Aircraft, Limited, lately has been the "Skua" dive bomber, which has earned a great reputation in the hands of the Naval Air Service, commonly called the Fleet Air Arm. The "Skua" was flying and was a familiar sight before the outbreak of war.

Just before war there was a big review of Service aircraft for the benefit of foreign Air Attaches, and our own members of Parliament, at the R.A.F. Station at Northolt. After it was all over two machines, both twin-engine types, shot across the aerodrome, quite low down, coming apparently from nowhere and disappearing in the same direction. One of these we came to know afterwards as the "Botha." It was intended to be a medium bomber, but it has been developed as a twin-motor trainer, in which pilots of single-motor aeroplanes are taught to fly with two engines before passing on to operational training units with bigger and faster machines. The "Botha" is used also for coastal reconnaissance. Our cover this month shows a Blackburn "Botha" flying over a convoy, and is reproduced by courtesy of Blackburn Aircraft Limited.

Latest "Flying Fortress"

The upper photograph on this page shows the latest version of the well-known "Flying Fortress" heavy bomber. The new version is classed as the B-17E of the U.S. Army Air Forces and the "Fortress" II of the Royal Air Force, and the first machine made its first test flight at Seattle, U.S.A., on 5th September last. The B-17E is 5 ft. longer than previous types in the series, and the loaded weight is about 5 tons more than that of the B-17D. The fin of the tail unit has been extended forward along the top of the fuselage to increase the stability of the machine at great heights, the tailplane has been redesigned and increased in span, and the weight of internal armour is greater. A third power-operated gun turret has been added, and the B-17E has one on the top, another underneath the fuselage, and one behind the tall fin and rudder at the stern. Details of the Wright engines fitted in this great machine have not been released.

Both the Seattle and Wichita factories of the Boeing Aircraft Company have been greatly enlarged to increase the production of "Flying Fortresses," and preparations are being rushed forward for quantity production of the B-17E by the recently-arranged Boeing-Douglas-Vega joint production pool, which provides for the manufacture of completely assembled identical aircraft at the Douglas Aircraft Company's new Long Beach plant and the Vega Airplane Company's factory at Burbank, in addition to the two Boeing factories already mentioned.

* * * *

A first batch of 15 of 100 air pilots from Turkey recently arrived in England. The men are being sent here for specialised training in the R.A.F.

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A Free French regular air service between Brazzaville, French Equatorial Africa, and Cairo was inaugurated in October last.

A Rudderless Light Monoplane

The "Skyfarer," a high wing monoplane produced in the United States, has a tail unit with two fins but without a rudder. In flight the pilot turns the machine by the ailerons and elevator, which are operated by a handwheel in the cockpit. Another unusual feature of the machine is that its three-wheel undercarriage is of the fixed type, and the nose wheel is steered from the pilot's handwheel. The "Skyfarer" is a two-seater, with a Lycoming 75 h.p. engine, and can attain a speed of 100 m.p.h. Test flights of the first of these machines have been carried out.

Paratroop Carriers for Netherlands East Indies

The first batch of a fleet of Lockheed "Lodestar" transports ordered by the Netherlands East Indies Government have been delivered. The machines are modified for use as parachute troop transports, and those already delivered are in service in Batavia as parachute troop trainers.

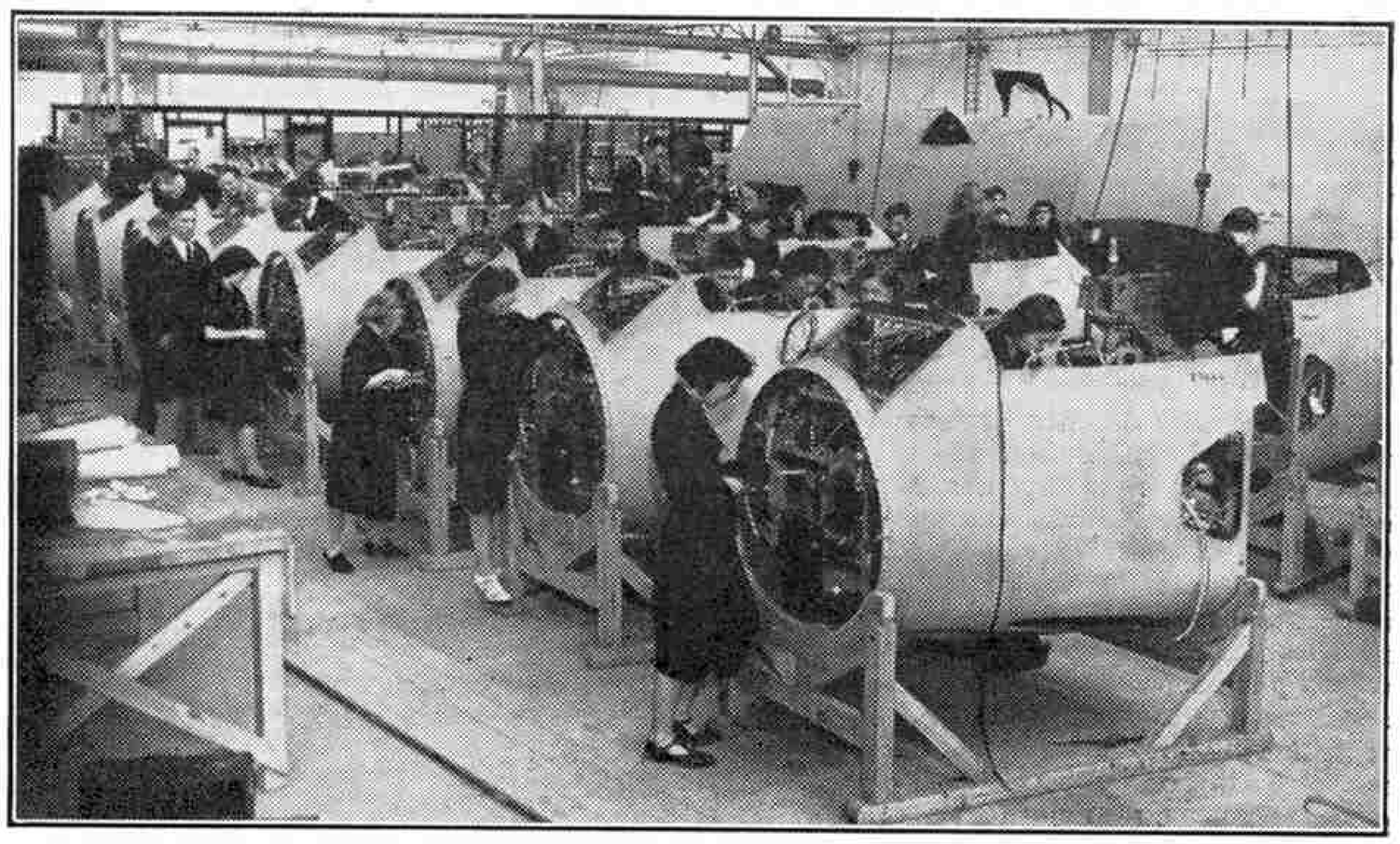
Each of these "Lodestars" can carry 20 soldiers and their equipment, in addition to machine guns, food, and medical supplies. The troops occupy cushioned benches along each side of the cabin. The machines are fitted with twin 1,100 h.p. Wright "Cyclone" engines, and with full load have a top speed of at least 250 m.p.h. The service ceiling is 23,400 ft.

United States Air Force Re-organisation

In the United States all military air activities are now consolidated under a new Command called the Army Air Forces, with Major-Gen. H. Arnold in command, assisted by an air staff organised on the lines of the General Staff of the United States War Department. The U.S. Army Air Corps retains its name and duties, and Major-Gen. G. H. Brett still commands it. An Air Force Combat Command has been formed from the former General Headquarters combat organisation.

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The Fairchild M-62 monoplane has been chosen as the new trainer for the Empire Air Training Scheme in Canada. The first batches of these low-wing machines will be produced in the United States, and are expected to be delivered early next year.



Building "Bristol" Beaufighters. Here women are seen equipping the pilot's cockpits with the many auxiliary items, which nclude switches, dials, and indicators on the dashboard, and pneumatic and hydraulic controls. Photograph by courtesy of The Bristol Aeroplane Co. Ltd.

A Night Fighter Motto

A snarling leopard with teeth bared ready for the kill has been chosen as a badge by an R.A.F. night fighter squadron whose victories over German bombers have already reached double figures. The squadron had a number of "kills" during the heavy raiding on Glasgow earlier in the year. The motto of the badge, "*Caedimus Noctu,*" is interpreted by the squadron as: "We strike down by night."

Recent Outstanding Flights

At the end of August last three new Douglas DC-3 air liners were delivered by air to Inter-Island Airways Ltd., of Honolulu. The aircraft took off from Oakland, California, and it is claimed that by covering the 2,100 miles to their destination in 13 hrs. 55 min. they set up a new commercial landplane record for a flight from the United States to the Hawaiian islands. Each machine has seating for 24 passengers, and on the delivery flight was manned by a crew of four. The new air liners supplement the company's fleet of Sikorsky S-43 amphibians, and are being used on air services linking up the six main islands in the Hawaiian group. These services have a total route mileage of about 400, the greater part over water.

A pilot of the U.S. Army Air Corps returning to America from the Middle East in a four-engined bomber flew 3,400 miles of the way, from Takoradi, on the Gold Coast, to Belem, Brazil, in 13 hrs. 45 min. This long non-stop flight was accomplished in daylight and is claimed to be the longest distance ever flown between sunrise and sunset.

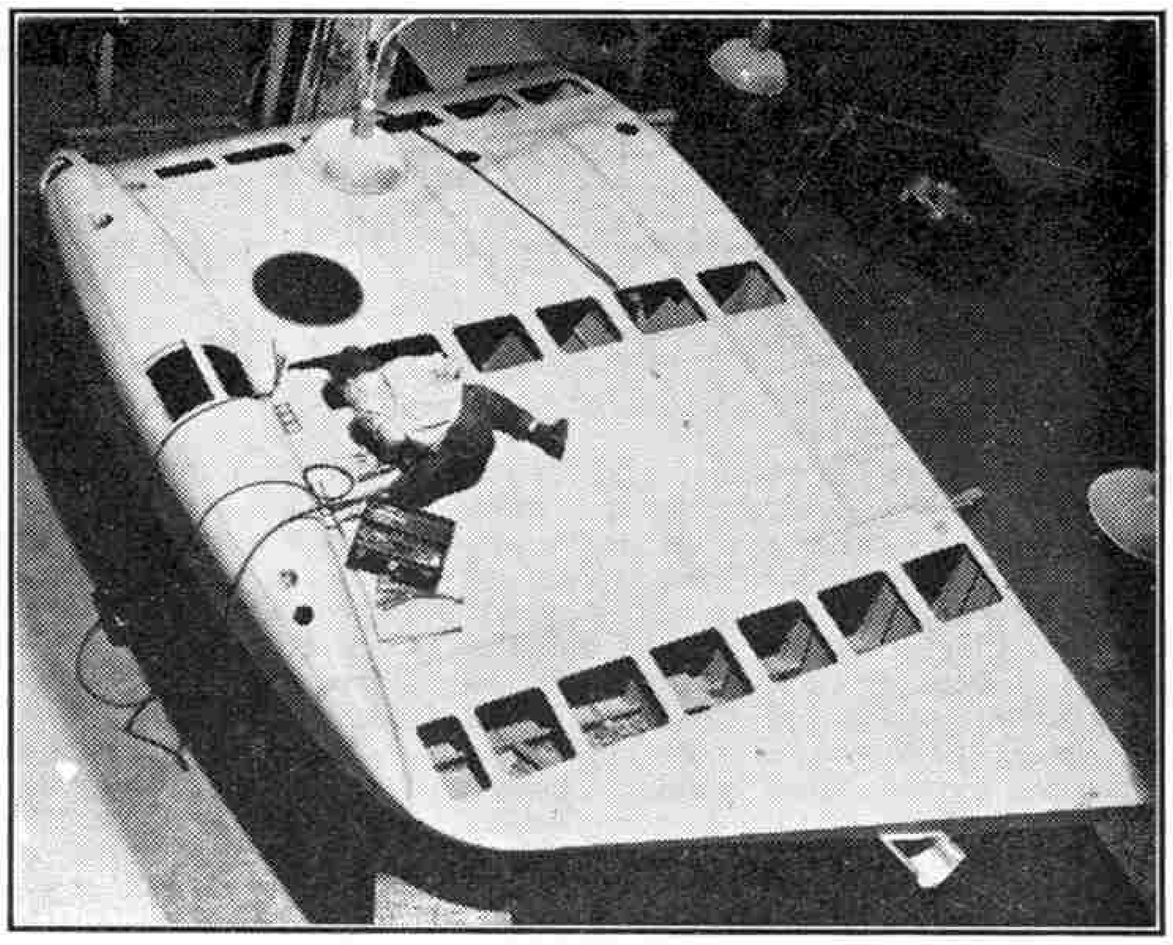
Another recent flight claimed as a record was made by a Consolidated "Catalina" flying boat. It was flown from the United States across the Pacific to the Netherlands East Indies in a flying time of 16 hrs. 50 min.

Paul Codos, the well-known French pilot, recently flew from France to French Somaliland and back in four days. He took off from Marignane aerodrome for Jibuti on 16th September, and setting off back from Jibuti in the early afternoon of the 19th he landed at Marseilles next morning. Codos has made many long flights, and is probably best known by his flight on 5-7th August 1933, when he and Maurice Rossi broke the non-stop distance record by flying 5,657 miles from New York to Rayak in Syria, their time for the flight being 55 hrs. 49 min.

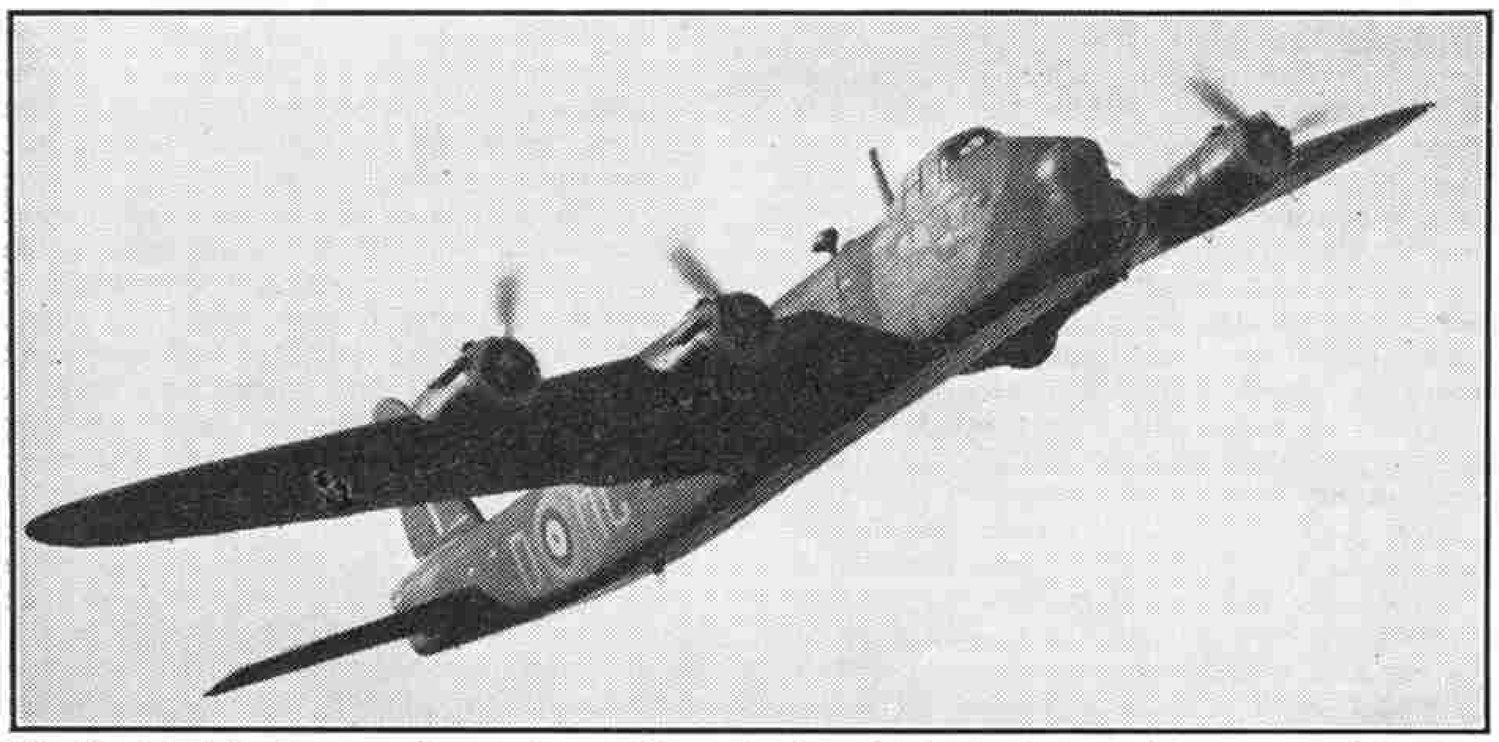
R.A.F. Officers for United States

During recent months official observers from the U.S. Army Air Corps have been attached to the R.A.F. for periods of duty. Arrangements have now been made for a limited number of R.A.F. officers, with special experience of active service in bombers and fighters, to be attached for a short period to units of the U.S. Air Forces corresponding to those with which they have served in the R.A.F. In this way a direct exchange of knowledge between the two Air Forces is achieved.

The first six R.A.F. officers chosen for this interesting duty all have distinguished records. They include Group Capt. J. N. Boothman, A.F.C., who was a member of the British team that won the famous Schneider Trophy outright for Britain in 1931. Another of the officers is Wing Commander H. I. Edwards, the 26-year old Australian who won the Victoria Cross for a daring raid on Bremen last July. Wing Commander A. G. Malan, another of the chosen, holds the D.S.O. and D.F.C., and is Britain's top score fighter pilot, with 35 German aircraft officially to his credit. Another "ace" fighter pilot included is Wing Commander R. R. S. Tuck, with 27 enemy aircraft officially to his credit.



At work on one of the two hydrostabilisers for a Boeing 314A "Clipper" flying boat. The hydrostabilisers are stub wings that ride on the water when the flying boat is taxying, and give it lateral stability.



The Short "Stirling," one of the new types of heavy bombers that have taken part in very successful R.A.F. night raids on Germany.

Bomber Pilots' Mascots

Many members of R.A.F. bomber crews carry some personal possession with them whenever they fly over Germany. There is usually a story attaching to these objects. One bomber pilot keeps in his pocket a small splinter from a bomb that wrecked his home. Another carries a cigarette holder bought in Berlin before the war.

Qantas Empire Airways Give Helping Hand

Under an arrangement just brought into operation crews of Qantas Empire Airways are flying a proportion of the Empire air journeys from Sydney as far as Karachi, instead of handing over to a British Airways crew at Singapore. This operation saves the British crew having to fly beyond Karachi, and enables them to have a longer rest there before taking over a westbound aircraft that normally they would receive at Singapore. The plan has been introduced owing to the increased demands on the pilots available for the British Empire air services.

Air Training Corps News

Cadets awarded an Air Training Corps proficiency certificate and star, and now entering the R.A.F., are having specially speeded-up classes at Initial Training Wings, the R.A.F. instruction schools where the first stage of air crew training is given. As more Cadets come of age for R.A.F. service it is planned to open special Initial Training Wings for them so that they can pass on more rapidly to the further stages of their training.

The A.T.C. proficiency certificate and star are awarded to Cadets who have passed tests in Morse, mathematics, physical training, and one special R.A.F. trade subject, and who have had at least six months' training with the Corps.

"*Venture Adventure,*" the first film about the Air Training Corps, is ready and will soon be released. It was recently given a pre-view at a gathering of Senior R.A.F. and A.T.C. officers, who included Air Commodore Chamier, the Commandant, and Mr. Wolfenden, Air Ministry Director of Pre-Entry Training. The film was made by the Crown Film Unit in co-operation with the R.A.F. and A.T.C., and in 7 min. of stirring action pictures it shows boys of all walks of life answering the call for air preparedness. There are intimate "shots" of the Cadets at work and play, and of their visits to Air Force Stations where they see "the real thing"—operational aircraft of the R.A.F. going into action.

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Aircraft built or assembled in Canada since the outbreak of war total 3,749.

Photography

Tinting Your Photographs

By John J. Curtis, A.R.P.S.

NEVER before has photographic tinting had so many devotees. It is a most popular pastime with men in the Forces, especially the Navy; men and women are finding it a most interesting way of spending their time in A.R.P. stations; and the A.F.S., in between their calls of duty, are to be found putting a spot of flesh tint on the faces (photographic ones!) of their comrades. Further, there is many a household which, just as soon as the evening meal is cleared away, bring out the box of tints and start working on some of the prints they have selected for Christmas cards and calendars. Tinting gives every photographer a chance to put a little sparkle of life into his prints.

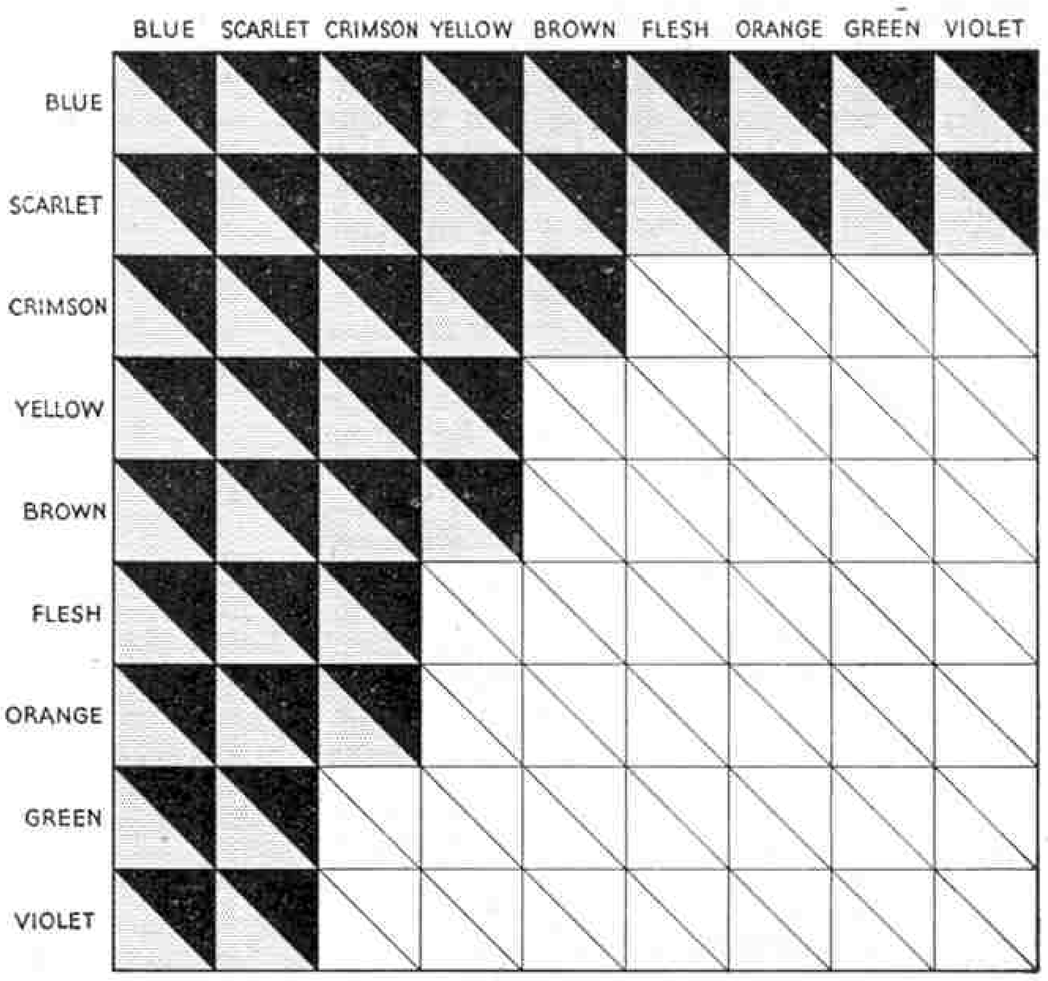
The best sets of tints and the most popular are those sold in boxes containing nine little square bottles each full of a concentrated aniline dye. The colours are blue, scarlet, crimson, yellow, brown, flesh, orange, green and violet; a range that will satisfy the needs of all. When one realises that each of these is capable of mixing with any other or others in the box, it will be understood that it is possible to get any shade or tint desired. Let me give one or two examples of the lines on which to experiment. If you take a brushful of yellow and another of blue you will obtain green; and if you use more of one than the other the shade will be different. Take a spot of crimson and one of yellow and you will get a scarlet; or blue and red will give violet. If you desire to use a shade of grey, take equal parts of yellow, crimson and blue, and you will find the result is a neutral grey; this can be changed by the slight increase of any one of the three colours over the other two. This mixing is in itself a very interesting part of the work and one on which it is wise to spend a little time. Be sure not to use the dyes at their full strength; the majority of failures result from trying to use the colours too strong. You hardly ever want the bottle strength, and it is surprising how much water the tints will stand.

Now a word about the preparing of a print for tinting. Do not attempt to work on a dry print; you will give it up in despair or make a very poor job of it. The print must be soaked in clean water and, if it happens to be on paper coated with a very hard emulsion, you may have to give it a bath of hot water. You all know that gelatine is used in the manufacture of photographic paper, and with some of the glossy types this is specially hardened so that the actual surface is like a sheet of glass and is almost as hard. When the print has been soaked the surface is in a condition that allows the tint to sink in, and this is the condition you require for the best work. All surface water must be blotted off with clean blotting paper, and it is advisable to lay the print on a piece of glass or other hard substance. If the room in which you are working is very warm you may find the print will dry before you have finished the tinting. Then you must take your piece of blotting paper, soak it in clean water, and lay it gently on the print for a few seconds.

Preparing the colour is done by placing a spot or two of the tint in the paint saucer and adding two or three brushfuls of water until you have diluted it to the depth required. Do not be afraid of using it in too weak a colour. The colour should be applied by means of thin or weak washes. Each application should be blotted and another application made over the previous one; and this is then blotted and the operation repeated over and over again until the required depth of colour is gained. You will soon see that this has many advantages, the first of which is that all hard outlines of colour are avoided and it is possible to get "fading away" on certain parts of, say, the sky or sea. So do not be afraid of water and blotting paper. It is only on tiny parts of the image where the concentrated colour is required, such as the picking out of flowers or coloured patterns included in the print.

I have found it an excellent practice to sepia tone my prints before tinting, as this gives a ground work for the colours, and it certainly makes a good impression.

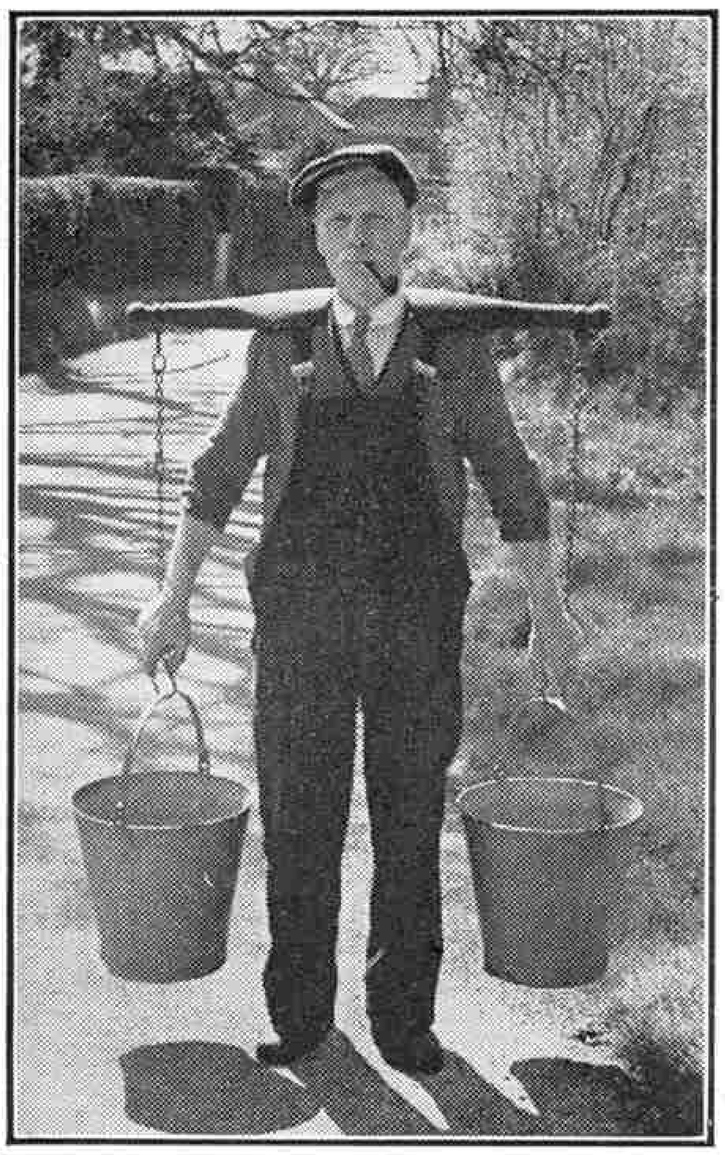
Many prints will require only a very small amount of tinting; a portrait needs just a touch of flesh tint on the face and hands, a spot of a deeper tint on details of the dress or uniform, and very little else. Do not strive to colour everything in a landscape; a pale wash on the sky to make it look like a summer blue sky, a wash of green on the grass patches, and a deeper green for the trees with a touch of brown for the trunks, usually gives the right effect. If the print has a white cottage with some flowers growing in the garden, leave the cottage as it is and put colour only on the flowers.



The light shade represents the colour named at top of each column, while the dark shade indicates where the colour named on the left has been superimposed. For example, the fifth square in the first column on the left is tinted first with blue all over and is then coated on one half with brown.

Finally a little advice about the brushes. It definitely pays to get some good sable hair brushes, and I suggest one each of numbers 0, 1 and 3 with which to start. These cost about 9d. to 1/3 each at present. You will find great help from a chart showing the effect of superimposing one tint over another. The accompanying illustration shows the idea. The chart is made by ruling a sheet of drawing paper into 81 squares. The names of the nine tints are written along the top of the chart, and down the left-hand side in the same order. Each square is then covered with the tint named at the top, and when this is dry one half of the square is treated with the colour named at the left-hand side. This work is done with the concentrated dyes, and when the chart is finished it shows the effect of superimposing each colour over each of the other eight, and also the result of two applications of the same colour.

The hints given in this article are the result of an experience of tinting extending over many years. It is possible, however, that some readers who take up the hobby may come across difficulties that there has not been space to deal with. In such cases the Editor will be glad to give advice.



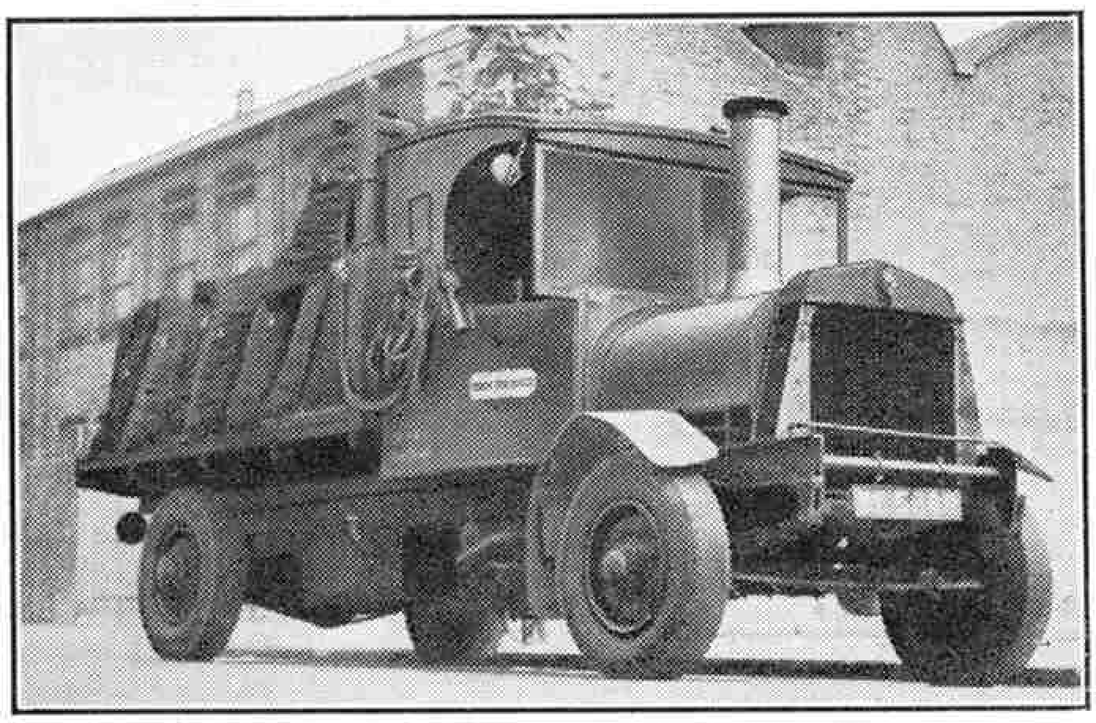
"The Yoke." Photograph by M. W. Taylor, Southall.

From Our Readers

This page is reserved for articles from our readers. Contributions not exceeding 500 words in length are invited on any subject of which the writer has special knowledge or experience. These should be written neatly on one side of the paper only, and should be accompanied if possible by original photographs for use as illustrations. Articles published will be paid for. Statements in articles submitted are accepted as being sent in good faith, but the Editor takes no responsibility for their accuracy.

An Unusual Steam Wagon

Until recently the strange type of steam wagon seen in the accompanying photograph was used extensively in North London. As can be seen from the photograph, the resemblance to a petrol-engined lorry is remarkable, for with the exception of the funnel it is an exact outward copy of one. It is however, a "Clarkson" three-ton steam wagon. The bonnet covers a vertical boiler, and the radiator is really a condenser in which the exhaust steam is condensed at atmospheric pressure. This of course serves two purposes. In the first place it conserves the water for re-use, and in the second it lessens greatly the back pressure in the engine cylinder, thereby increasing the power of the engine. The fuel used was coke, so that there was very little smoke from the engine.



A steam wagon that looks like a petrol-engined lorry with a funnel. Photograph by C. Temple-Browne, Tottenham, N.17.

I am afraid that the example shown in the photograph is the last that will be seen of these interesting combinations on the road, as to the best of my knowledge the company owning it was the only one running them in recent years.

C. Temple-Browne (Tottenham N.17).

A Visit to a Coal Mine

As mining is playing such a vital part in our War effort I was thrilled to have the opportunity of visiting a Yorkshire colliery where about 1,500 men are employed, including surface and underground workers, and 1½ million tons of coal are produced annually. I was given a miner's lamp and then descended the 1,992 ft. deep shaft. Normally the cage is lowered in 40 sec., at a speed of about 35 m.p.h., but for the visitor it descended in 50 sec. and even then the sensation was far from pleasant. I was interested to note that I was handed a number check, so it was impossible for me to be left in the pit bed.

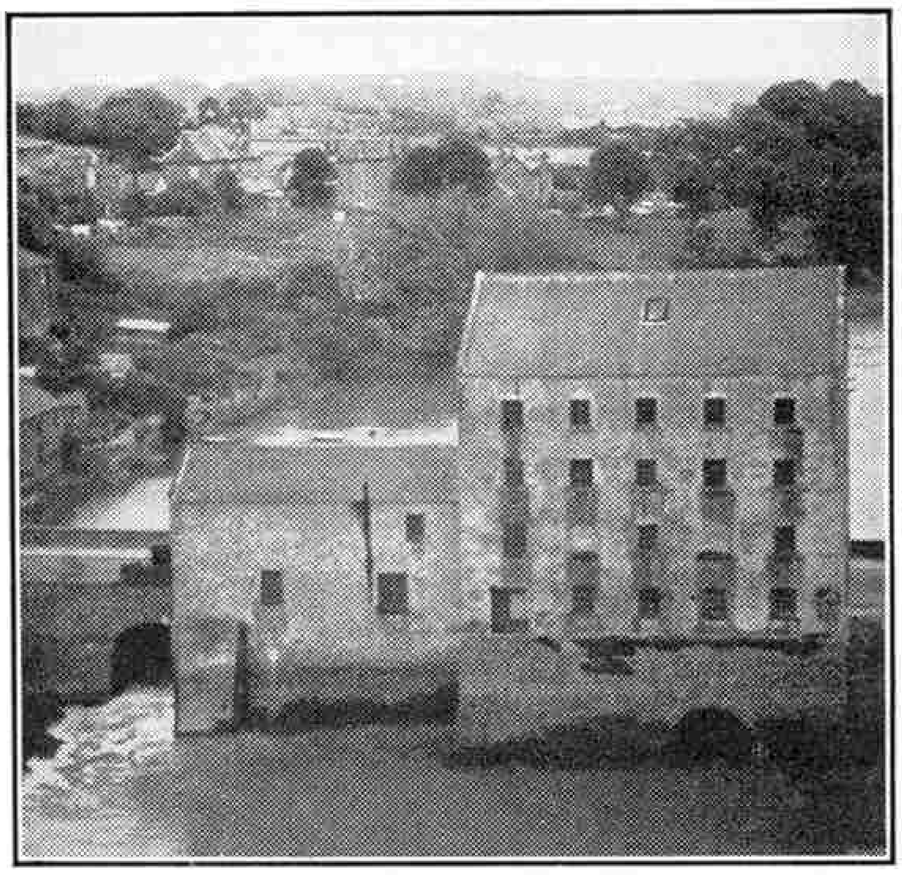
The underground is divided into districts, which are reached by a maze of small roads branching off the main haulage road. This is four miles in length, with high-white-washed walls and a single row of electric lights above. There are eight sets of rails and the road is slightly inclined, so the coal trucks run by gravity to the pit bottom. On the smaller roads engines are used for hauling the trucks. Each district in turn is divided into workings, where the roads are very narrow, and here ponies do the hauling. In this pit there are 130 ponies, which are looked after very well indeed.

Some of the districts are several miles from the pit shaft. After walking with my guide along a narrow passage we came to a blank end, where the coal seam was 6 ft. thick. Branching off at right angles was a low tunnel about 2 ft. high, and here were the miners, clad only in trousers and crouched in all sorts of positions. The heat was intense, although a huge fan runs day and night at a tremendous speed to ventilate the mine. It was cool at the shaft bottom, and for probably a mile away, but as the air travels through the workings it becomes very warm.

Every few yards along the roads were short props to hold up the roof. The main roof was supported by steel arch girders costing £1,200 per mile, but most miners prefer the wooden props because they creak and give a warning if the roof moves. The men dug forward all the time, and as they dug out the coal, the earth and rock was packed in behind them.

The narrow roads are continually lengthened to keep up with the miners. As an empty truck reaches the shaft bottom the cage is opened and the trucks are pulled through to the south side. They are hauled by an engine to the various districts where they are filled, and are then hauled to the north side, where they run down the incline to the foot of the shaft, to be pulled into the cage. All the engines are driven by compressed air and the telephones and electrical fittings are sparkless, so there can be no danger of igniting any gas and causing an explosion. Danger also might arise from coal dust, and stone dust is sprinkled daily to reduce this risk.

Dennis Tate (Elland).



The tide mill at Pembroke, South Wales. This is the only one of its kind now working in Great Britain. Photograph by K. W. Green, Heswall Hills.

Britain's only Tide Mill

The deservedly famous castle at Pembroke, South Wales, lies alongside the Pembroke River at a point where this is tidal. Of the thousands of people visiting the Castle every year few do more than glance at the bridge spanning the river, little realising that upon it stands a most unusual mill. As can be seen from the photograph of the mill on this page, it forms part and parcel of the bridge. This in itself is most unusual, but the mill also has the distinction of being the only one in Britain worked by tidal action.

The structure actually is a dam that is pierced on the left by a gate, through which the incoming tide runs to flood the mud flats further inland. At high tide the opening is closed and the water is trapped until the sea level falls. Then other doors are opened so that the water flows back to the sea through the hole seen beneath the building, turning as it does so a large water wheel built inside the structure.

This ancient mill was in full working order at the time of my visit. As the power was not then required for driving the wheel the water was being allowed to escape, and it can be seen as it rushes back to the sea.

K. W. Green (Heswall Hills).



Paper unwound from a dart board made of that material made a pile 5 ft. high. Photograph by Peter Wright, Birmingham 5.

A Dart Board Secret

Have you ever wondered what dart boards are made of ? Of course you know there are the cork, wood and rubber types, but have you ever examined one made of paper? I happened to come across one a few months ago, when I lived in Egypt, and thought I would unroll it. I succeeded in stripping off 250 yds. of paper 2 in. wide, which made the pile 5 ft. high shown in the accompanying photograph. It is difficult to believe that there could be so much paper in an ordinary dart board. The result of my experiment certainly startled me.

Peter Wright (Birmingham 2).

New Meccano Models

Coal Cutter—Match-Box Holder

THE model shown in Fig. 1 represents one of the many different machines used for cutting coal in mines. It is not designed for construction from any particular Outfit, but it is quite easy to build and requires only a moderate number of parts. A close-up view of the gearing of the model is shown in Fig. 2. The second of this month's models is a neat and useful match-box holder shown in Fig. 3.

The construction of the coal cutter is best begun by building the chassis. For this two $9\frac{1}{2}$" Angle Girders are spaced apart at their rear ends by a $2\frac{1}{2}$" Angle Girder and a $4\frac{1}{2}" \times 2\frac{1}{2}$" Flat Plate, and at their forward ends they are connected by a $2\frac{1}{2}$" Angle Girder and a $2\frac{1}{2}" \times 1\frac{1}{2}$" Flexible Plate. The $4\frac{1}{2}" \times 2\frac{1}{2}$" Flat Plate is extended $\frac{1}{2}$" by a $2\frac{1}{2}" \times 2\frac{1}{2}$" Flat Plate, which is bolted to it together with an E1 or E120 Electric Motor.

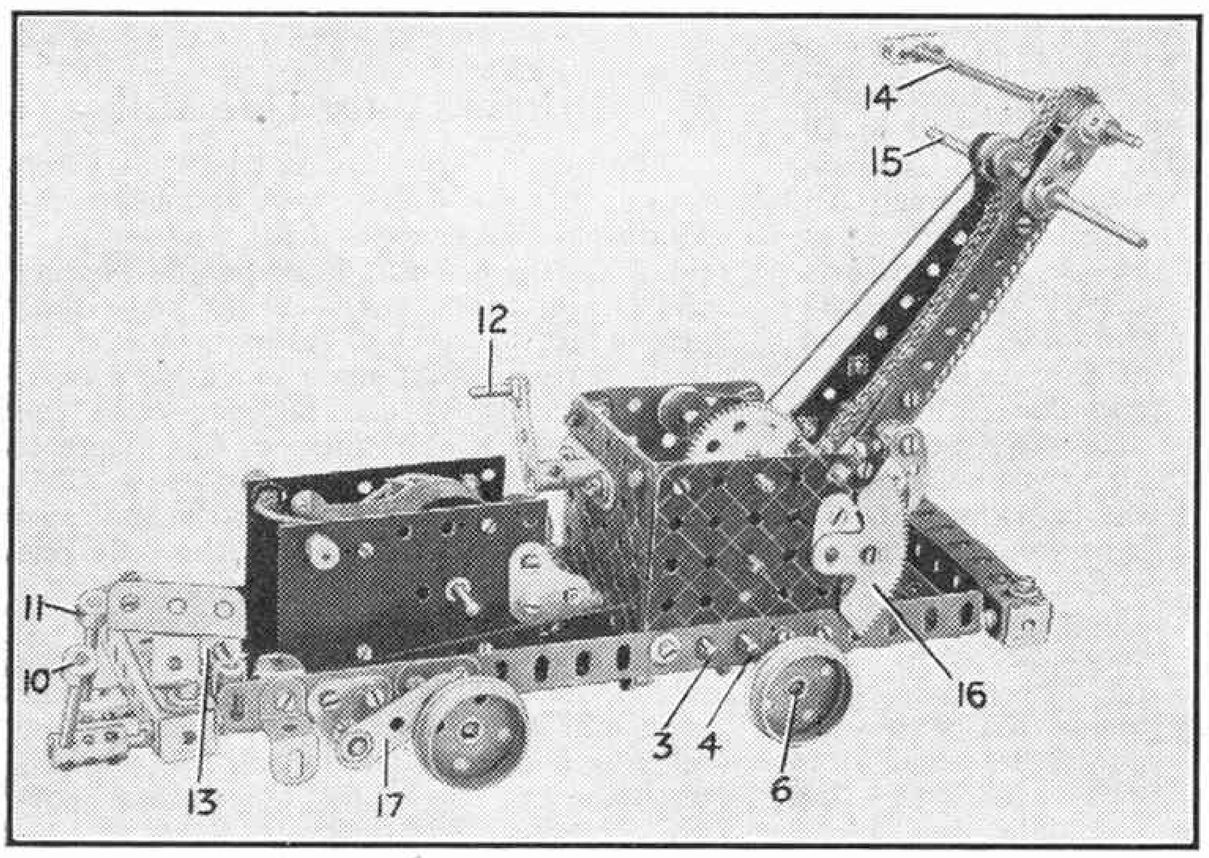


Fig. 1. A fine model of an electrically-operated coal-cutting machine.

A $2\frac{1}{2}$" Driving Band is passed around the armature shaft of the Motor, and a 1" Pulley is mounted on a 2" Rod journalled in Corner Brackets bolted to the Motor side-plates. The 2" Rod carries also a Worm that meshes with a $\frac{1}{2}$" Pinion on a second 2" Rod fitted with a $\frac{3}{4}$" Contrate 1. The Contrate forms one member of the reversing gear train. The other member is a $\frac{1}{2}" \times \frac{1}{2}$" Pinion 2 fixed to a 3" Rod 3, which is slideable in its bearings. The Pinion 2 remains in constant mesh with a similar Pinion on another 3" Rod 4, which also is slideable in its bearings.

The gear selector levers 10 and 11 are identical. The former is connected to an 8" Rod, and the lever 11 to a $6\frac{1}{2}$" Rod carrying a Collar fitted with a Threaded Pin at its front end. Bearings for the two Rods are provided by two $1\frac{1}{2}$" Angle Girders. The $\frac{1}{2}$" Pinion on the Rod 4 moves into and out of mesh with a 57-teeth Gear 5 and a 1" Gear mounted on the front axle, which is a 3" Rod 6. The Gear 5 is mounted on a 3" Rod, which carries a 1" Gear 7 and is arranged to slide in its bearings by moving a lever built up as shown.

The Gear 7 moves into and out of engagement with a 1" Gear 8 fixed to a 3" Rod that carries also a $\frac{3}{4}$" Sprocket. This Rod provides a pivot for the jib, which consists of two $4\frac{1}{2}$" Angle Girders. At the head of the jib is a $\frac{1}{2}$" fast Pulley mounted on a 1" Rod journalled in 1" Corner Brackets bolted to the $4\frac{1}{2}$" Angle Girders. A flat is filed on Rod 14 throughout its length.

The jib is elevated and lowered to adjust the drilling position by Cord attached to a winding drum driven from the $\frac{1}{2}$" Pinion 9, which meshes with a 57-teeth Gear on the drum. A length of Cord fastened to the Rod by a Cord Anchoring Spring is passed over the jib head pulley and fastened to a 3" Screwed Rod that joins the sides of the gear-box. A Coupling forming the drill is fixed on one end of the 6" Screwed Rod 14, and two bolts are fixed in its tapped bores. This Rod carries a $\frac{3}{4}$" Sprocket driven from a similar Sprocket on the Rod of the Gear 8. The Sprocket on shaft 14 carries a 5/32" Grub Screw that is screwed down so as to bear lightly on the flat filed on the Rod.

A brake for preventing the drum from unwinding too rapidly is formed by mounting a $\frac{1}{2}$" fast Pulley on the drum shaft and coupling it to the Screwed Rod by a $2\frac{1}{2}$" Driving Band. A ratchet device is used to maintain the jib in the desired position, and this consists of a spring-loaded Pawl lock-nutted to the jib and arranged to engage the teeth of a Rack Segment 16 bolted to the gear-box.

When it is desired to lower the jib the Pawl is released by depressing a foot pedal 13. The latter is a Flat Bracket pivoted to the chassis and fastened to one end of a length of Cord that passes round a Threaded Pin fixed to the chassis and over a loose Pulley on the Rod of Gear 8. The other end of the Cord is fastened to a $\frac{3}{8}$" Bolt lock-nutted to the boss of the Pawl.

The depth gauge 15, for measuring the depth of the hole drilled. is a 5" Rod held in position by two Collars.

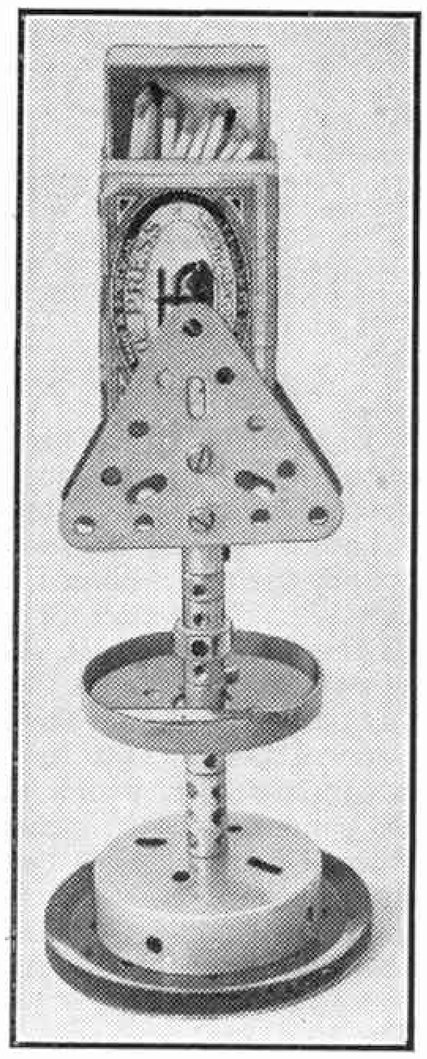


Fig. 3. A useful match-box holder.

Parts required to build model Coal Cutter: 2 of No. 5; 2 of No. 6; 1 of No. 6a; 2 of No. 8a; 2 of No. 9a; 4 of No. 9b; 3 of No. 9d; 2 of No. 9f; 1 of No. 10; 6 of No. 11; 4 of No. 12; 1 of No. 13a; 1 of No. 14; 1 of No. 15; 3 of No. 16; 5 of No. 16b; 3 of No. 17; 1 of No. 18a; 2 of No. 18b; 4 of No. 20; 1 of No. 22; 1 of No. 23; 3 of No. 23a; 2 of No. 26; 2 of No. 26a; 2 of No. 27a; 1 of No. 29; 3 of No. 31; 1 of No. 32; 93 of No. 37a; 76 of No. 37b; 65 of No. 38; 1 of No. 40; 1 of No. 48a; 1 of No. 53a; 1 of No. 58; 17 of No. 59; 3 of No. 62; 1 of No. 62a; 1 of No. 62b; 1 of No. 69a; 4 of No. 72; 2 of No. 77; 1 of No. 79a; 1 of No. 80c; 1 of No. 94; 2 of No. 96a; 1 of No. 111; 3 of No. 111c; 4 of No. 115; 2 of No. 125; 1 of No. 126; 1 of No. 129; 9 of No. 133a; 1 of No. 136; 1 of No. 147a; 2 of No. 176; 1 of No. 179; 2 of No. 186; 1 of No. 188; 1 E1 or E120 Electric Motor.

The match-box holder shown in Fig. 3 is an interesting little model. It is constructed by fixing a 4" Rod in the boss of a 3" Pulley that forms the base. A Boiler End, a Coupling and a Collar are then mounted on the Rod in that order. The tray for holding used matches consists of a Wheel Flange bolted to a Bush Wheel, and on the Rod above it are a Collar, an Octagonal Coupling, another Collar and finally a Large Fork Piece. Two $2\frac{1}{2}$" Triangular Plates grip the match-box.

Parts required to build model match-box holder: 1 of No. 11; 1 of No. 15b; 1 of No. 19b; 1 of No. 24; 6 of No. 37; 3 of No. 59; 1 of No. 63; 1 of No. 63a; 2 of No. 76; 1 of No. 116; 1 of No. 137; 1 of No. 162a.

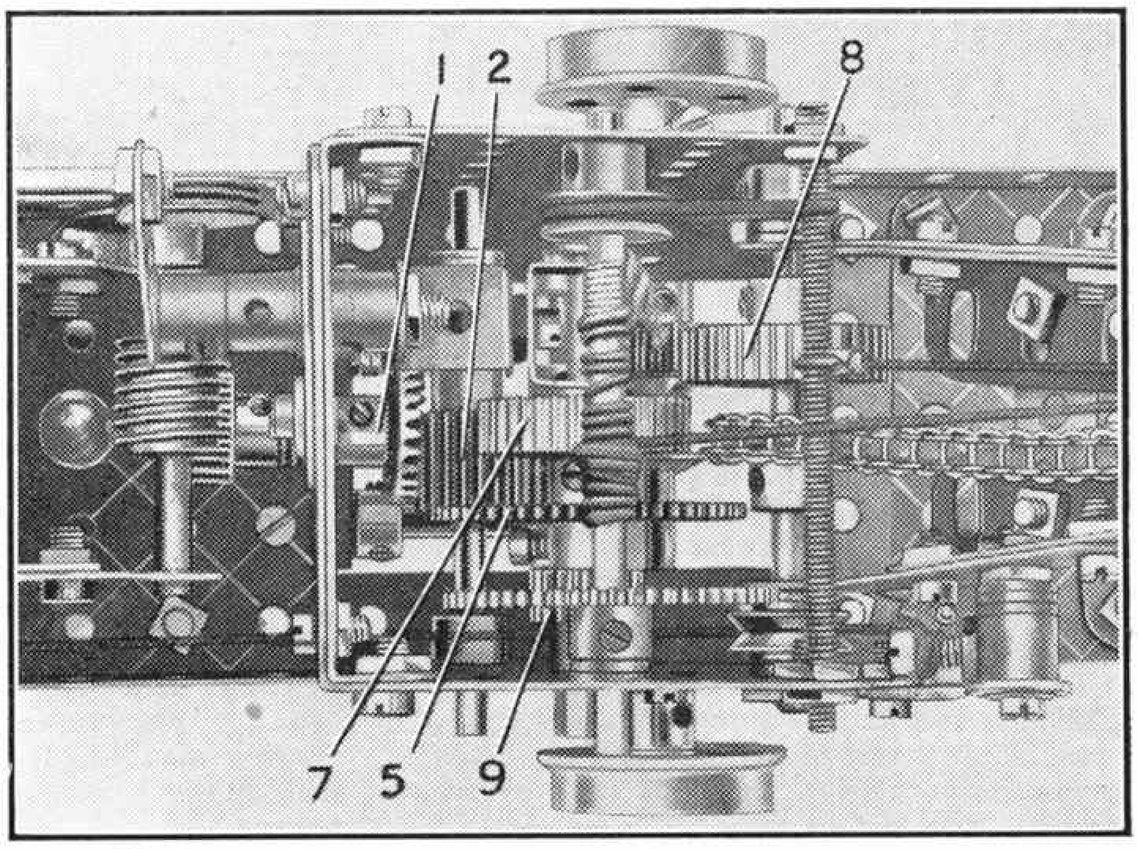


Fig. 2. A close-up of the gearing of the coal cutter shown in Fig. 1.

Suggestions Section

By "Spanner"

(530) A Novel Three-Speed and Reverse Gear-Box

(S. Tonkin, Bristol).

The compact gear-box shown in Fig. 530 employs only a few gears, but provides three different forward speed ratios and one in reverse. A suitable casing for the mechanism, such as that shown in the illustration, should first be constructed. The driving shaft is a 3" Rod 1 that carries a $\frac{1}{2}$" × $\frac{3}{4}$" Pinion 2, a $\frac{3}{4}$" Pinion and a 1" Gear, which are fixed to it in the positions shown. A $\frac{1}{2}$" Pinion is pivoted on a $\frac{3}{4}$" Bolt fixed to the casing, and meshes with the

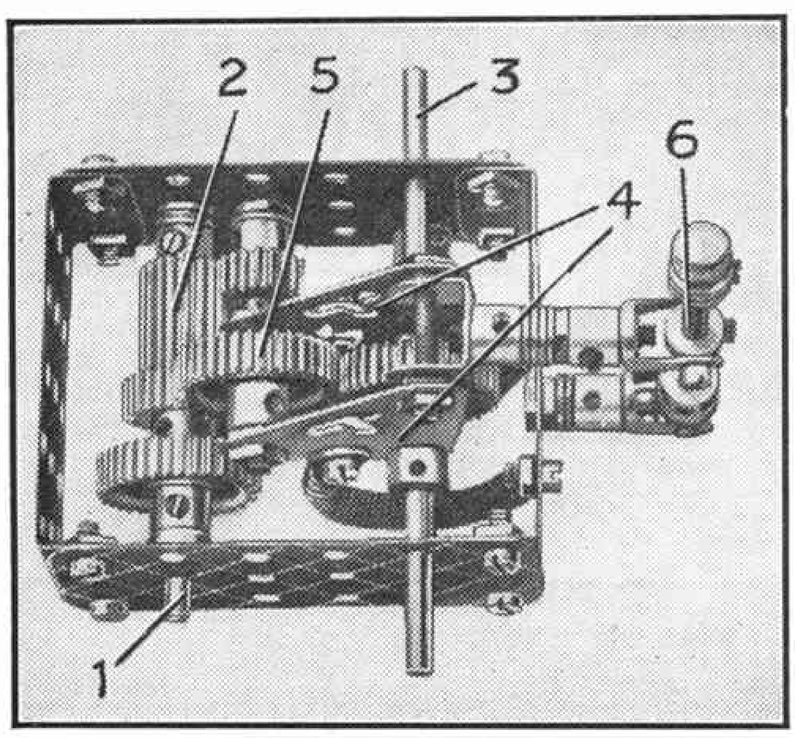


Fig. 530.

Pinion 2. The layshaft, which is also the driven shaft, is a 4" Rod 3, and it carries a 1" Gear and two $1\frac{1}{2}$" Corner Brackets 4 spaced from each side of the Gear by Washers and held in place on the Rod by two Collars. This Gear meshes with another 1" Gear 5 that is free to rotate on a 1" Screwed Rod held in Corner Brackets. Two Springs bolted to the Corner Brackets pass around a 3" Rod and are then attached to the gear-box casing.

The Corner Brackets 4 are also attached to a 1" Screwed Rod, on which is a Large Fork Piece that is lock-nutted by means of a $1\frac{1}{4}$" Bolt and Nuts to the boss of a Swivel Bearing. The Swivel Bearing is attached to the selector Rod 6, the lower end of which is inserted in a Universal Coupling fixed to the casing by a Threaded Pin.

To engage a particular gear train the selector is first moved to the right, as seen in the photograph, thus releasing Gear 5 from engagement. For a lower gear or for reverse ratio the selector is then moved away from the operator, while for a higher gear ratio it is pulled towards him.

The drive may be transmitted from the driven shaft 3 to the model in which the mechanism is incorporated by meshing a $\frac{1}{2}$" × $\frac{3}{4}$" Pinion, mounted on the Rod with a similar Pinion fixed on a Rod journalled at one of its ends in the gear-box casing.

The advantages of this type of gear-box over the more usual kinds are that gear changing is silent while working at any speed, and there is less wear of the teeth of the gears than in the more conventional types where the gears are slid into mesh while rotating.

Another interesting feature of this gear-box is that the Gears and Pinions are held in mesh by two Springs, which prevent any tendency of the teeth to "climb" under normal loads.

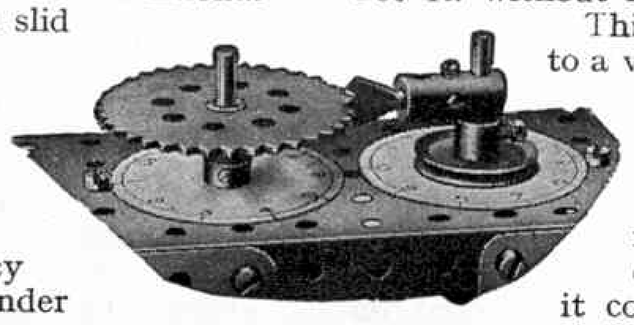


Fig. 531.

(531) Intermittent Rotary Striker

("Spanner")

Distance indicators, revolution counters and such-like recording instruments usually inc rporate some form of intermittent striking mechanism. This may be a simple ratchet movement, or one that is more complicated. One of the simple devices suitable for the purpose is shown in Fig. 531, and in this example it is applied to a distance-recording apparatus. In this model the axle of one pair of road wheels carries a Worm that meshes with a $\frac{1}{2}$" Pinion driving a short vertical Rod. The Rod is journalled in one of the holes in the Flanged Plate forming the base, and also in the centre hole of a $2\frac{1}{2}$" × $\frac{1}{2}$" Double Angle Strip secured underneath the Plate. A 1" fast Pulley is fixed on the Rod so that it bears lightly against the Flanged Plate, and above it is fixed a Coupling.

A Centre Fork in the unoccupied end of the longitudinal bore of the Coupling forms the striker, and as it rotates it engages with the teeth of a 2" Sprocket Wheel, one tooth being "picked" for every revolution of the striker. The Sprocket Wheel is carried on a 2" Rod journalled in bearings similar to those that carry the striker Rod. At its lower end the Rod is fitted with a second 2" Sprocket Wheel that acts as a ratchet, the pawl being formed from a $2\frac{1}{2}$" Strip bent to the required shape and attached to the base of the model by two nuts and bolts.

Two circles of thin paper are cut and pasted to the base plate, as shown in the illustration, and they are graduated according to the size of the road wheels. If 2" Pulleys with a thin strip of paper pasted round their rims are used as the road wheels, the striker will rotate once for every 10 ft. of travel. The paper disc corresponding to the striker may therefore be graduated into 10 spaces each representing a foot, and these can be subdivided into 12 spaces representing inches. The disc for the Sprocket Wheel must be divided into 36 spaces, corresponding to the number of teeth on the Sprocket; and each space will then correspond to 10 ft. When calibrated in this way the device is capable of measuring distances up to 360 ft. without repetition.

This mechanism is applicable to a very wide range of models, and with a few adjustments is suitable for incorporation in such models as cyclometers, bell striking devices and clocks, where it could be adapted to serve as an escapement.

(532) A Useful Momentum Motor

("Spanner")

When neither a Clockwork nor an Electric Motor is available for driving models a good substitute is a momentum motor of the type shown in Fig. 532. This gives a very powerful drive and is quite capable of operating models of the lighter kind, such as windmills, simple engines and road vehicles. The power of the motor is derived from the momentum produced in a heavy flywheel caused to revolve at high speed by turning a handle. A clutch is fitted on the handle shaft so that when a sufficiently high speed is reached the handle can be disconnected from the drive and the motor allowed to run freely. The bearings for the various shafts should be designed to suit the requirements of the model in which the motor is incorporated.

The flywheel is a Meccano Flywheel, part No. 132, and it is mounted on a Rod 3 that carries also a $\frac{1}{2}$" Pinion 5 meshing with a 57-teeth Gear. The latter is fixed on the inner end of a Rod that carries a $\frac{1}{2}$" Pinion 4 at its other end. This $\frac{1}{2}$" Pinion meshes

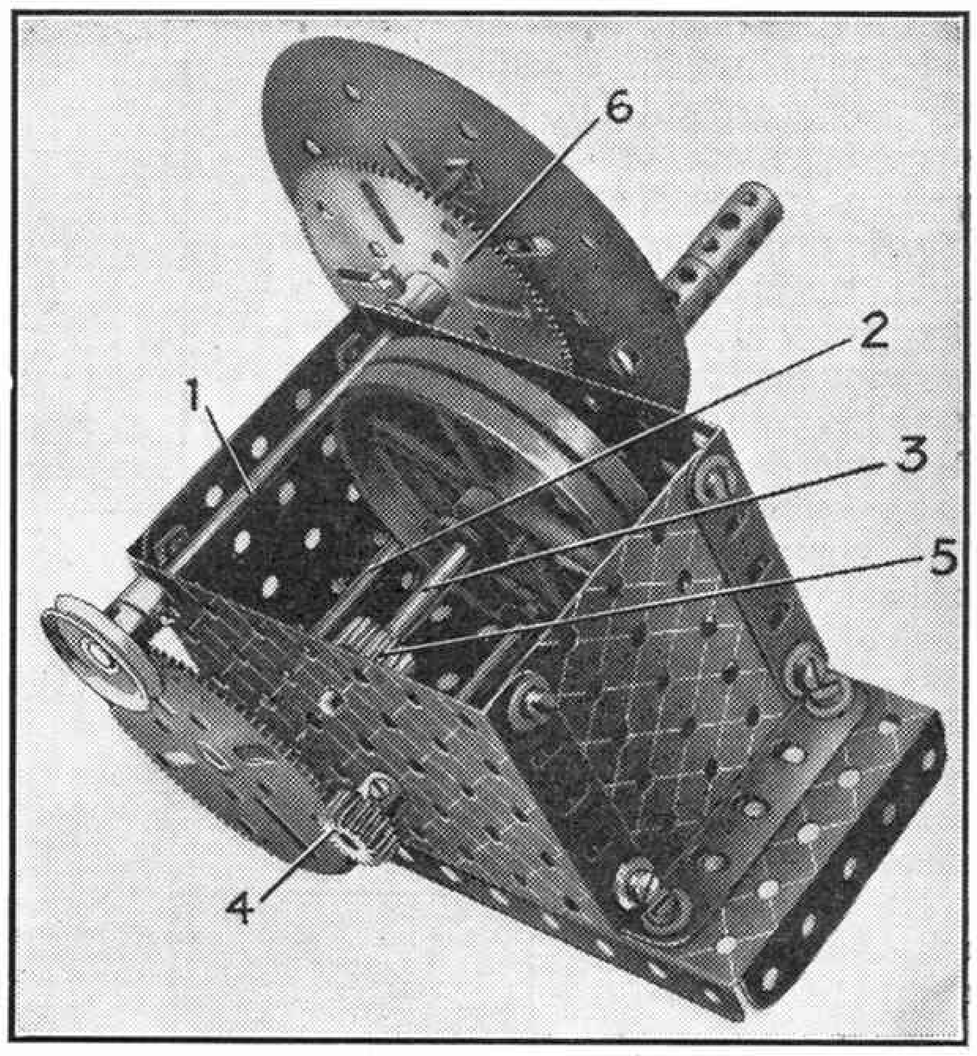


Fig. 532.

with a $2\frac{1}{2}$" diam. Gear fixed on one end of a Rod 2 bearing at its other end a $\frac{1}{2}$" Pinion driven from a $2\frac{1}{2}$" diam. Gear 6 on the shaft of the winding handle 1. To this shaft is fixed a 1" Pulley from which the final drive is taken. The handle, formed from Couplings, is attached to a 4" Circular Plate bolted to a Bush Wheel, which is loose on the winding shaft. The Circular Plate is caused to contact the $2\frac{1}{2}$" diam. Gear 6 by pushing the driving handle inwards. This action compresses a Spring placed between the Gear and the Circular Plate, and in so doing causes the shanks of two $\frac{3}{8}$" Bolts fixed in the Circular Plate to engage with holes in the $2\frac{1}{2}$" Gear so that it rotates with the Plate.

MECCANO COMPETITIONS

By "Spanner"

GRAND "CHRISTMAS" CONTEST

In order to ensure that every model-builder shall have an opportunity to exercise his skill during the Christmas holidays I am organising a grand Christmas model-building competition, in which models of all kinds may be entered, and splendid prizes will be awarded for the best and most interesting submitted. These prizes will be cheques and postal orders.

The rules of the Contest are few and simple. There are no entrance fees to pay or forms to fill in, and readers of any age can take part. Models may represent any desired subject, and may be constructed from any size of Outfit or number of parts, but it is wise to remember that simple well-built models will be more favourably considered by the judges than complicated structures that are scrappily built.

I advise intending competitors to try to incorporate in their models some ingenious use for a Meccano part, or a new Meccano movement. Models displaying originality of this kind, no matter how simple they may be, will have the best chances of winning the prizes. When the model is completed a photograph of it should be prepared, but if this is not possible a good sketch will do. The competitor's age, name and address should be written on the back of the illustration, and it should be sent, together with a brief description of the model, to *"Christmas Model-building Contest, Meccano Ltd., Binns Road, Liverpool 13."* That is all there is to do.

Each model submitted must be the competitor's own work. *Actual models must not be sent.*

The competition will be divided into two sections; A, for readers living in the British Isles; B, for readers living Overseas. Section A will be closed for entries on 31st January 1942, but Section B will remain open until 30th April 1942.

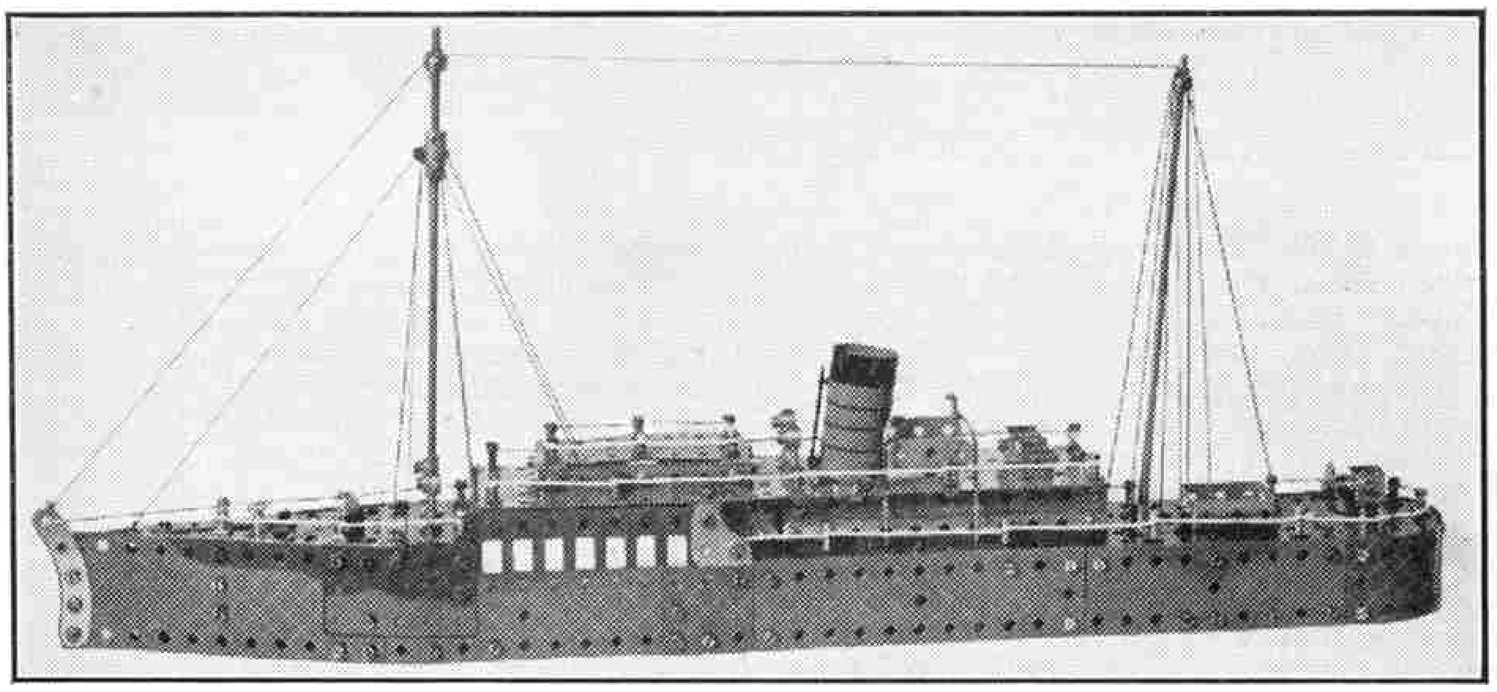
The following prizes will be awarded in each Section of the Contest. First, Cheque for £2/2/–; Second, Cheque for £1/1/–; Third, Cheque for 10/6. There will be also five consolation prizes, each of which will consist of a Postal Order for 5/–.





Two prize-winners in Meccano competitions. Above, W. A. Kirby, Haslingden; Right, H. Coleman, Leicester.

It is powered by a No. 1 Clockwork Motor, which is used to raise and lower the sign and fire the shells. The letters forming the slogan are built up from Strips, and are raised and lowered by Cranks driven by the Motor.



A fine model of a cruising yacht built by H. Lee, Ardrossan.

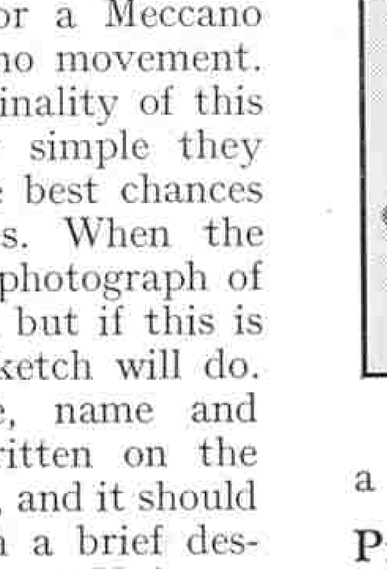
Prize-Winners in the "Victory V" Contest

This Contest was announced in the September 1941 issue of the *"M.M."* and the prize-winners are as follows:

1st Prize, Cheque for £2/2/–: P. Winterburn, Ossett; 2nd, Cheque for £1/1/–: D. Frankish, Boston, Lincs.; 3rd, Postal Order for 10/6: P. Cussins, Whitby.

Postal Order for 5/–: J. Kennett, Gerrards Cross; B. Williams, Newport; R. Middleton, Hull; S. Barton, Stafford.

In this Contest competitors were asked to build models incorporating the "Victory V" symbol, but no restrictions were placed on the kind of subjects suitable for models or the number of parts to be used in building them. This freedom allowed competitors to give their imaginations full rein, and many ingenious models resulted. For example, P. Winterburn, Ossett, Yorkshire, built a model howitzer that displayed the "V" sign in a very interesting manner. Every time the gun is fired the slogan "V for Victory" appears from behind a screen arranged on the chassis. The gun fires shells consisting of Couplings attached to Collars and is mounted on a chassis fitted with rubber tyred wheels.





J. Matthews, Exeter, above, and W. E. Houghton, Daventry, left, have both won prizes in Meccano Contests.

In the fine model bridge that won Second Prize for D. Frankish, Boston, the "V" motif stands out very clearly, but is so cleverly incorporated that it is not too obtrusive. The carriageway of the bridge is constructed of $5\frac{1}{2}'' \times 2\frac{1}{2}''$ Flexible and Flanged Plates, bolted at each side to $5\frac{1}{2}'' \times 1\frac{1}{2}''$ Flexible Plates. In the centre of the bridge the Morse signal for letter V, . . . –, is represented by $1\frac{1}{4}''$ Discs and Flat Trunnions, and on each side of these $2\frac{1}{2}''$ Strips are bolted to form a "V." The Piers also are in the form of V's. They consist of $12\frac{1}{2}''$ Strips fixed at their upper ends by means of $1\frac{1}{2}''$ Strips to the roadway, and at their lower ends to $3\frac{1}{2}'' \times 2\frac{1}{2}''$ Flanged Plates. The model is completed by an ornamental arch consisting of Strips and Curved Strips bolted to two Angle Girders.

The Third Prize was awarded to P. Cussins, Whitby, for an imposing model hall stand. This is constructed from Angle Girders and Flexible Plates, and is approximately 2 ft. 6 in. in height. In this model, as in the previous one, the "V" sign is outstanding, yet it takes its place neatly in the general construction.

Among other interesting entries were neat motor car mascots, musical instruments, cranes and penracks of various kinds, all of which incorporated the "V" sign in a more or less ingenious manner.

Club and Branch News

A Merry Christmas!

A Merry Christmas to every member of the Guild and of the H.R.C. This is our third wartime Christmas, but there is every reason for the exchange of the cheerful greetings that characterises this season of the year. Indeed our wishes for a merry time should be more cordial than ever, for so many of our members are now serving in the Forces both at home and overseas, and they will treasure the goodwill of their friends at home.

A Model Suggestion

I have been greatly interested in the use made of models to raise money for funds for the purchase of aircraft, the provision of comforts for the troops, the Red Cross or any of the other good purposes for which money is now needed. Meccano and Hornby Trains lend themselves splendidly to such efforts, for everyone admires a well-built model, a battleship, an aeroplane or a locomotive for example, or an efficient layout on which trains run smoothly and well, and all would be ready to make a small contribution in recognition of the effort made in arranging a display or exhibition of a good piece of work. Every Guild and H.R.C. member should try to think out some novel scheme of this kind. Club efforts can be planned on a large scale, but the lone member need not be discouraged, for every little helps.

* * * *

Don't forget the "*M.M. Harmonica Fund for the R.A.F.*" Subscriptions are now coming in. Have you sent yours?

M. B. Carter is the newly-elected President of the Leas School M.C., Leader Mr. J. F. G. Bigland. This fine school Club was affiliated in May 1928, and has always arranged attractive programmes of Model-building Competitions, Lantern Lectures, Film Shows and Visits. A special feature also has been made of the construction of large demonstration models.

Club Notes

Plymouth M.C.—Model-building is enjoyed by all members, and other pursuits actively carried on include Model Aeroplane Construction, Printing and Hornby Train operations. Talks on First Aid also are given by members, and Lantern Lectures have been enjoyed. Membership is increasing rapidly, owing to the interest and variety of the Club proceedings, and four meetings are held each week. Club roll: 113. *Secretary:* M. Allen, 11, Rosedale Avenue, Peverell, Plymouth.

Acton M.C.—The position of the Club has been reviewed and the rules revised. Models recently constructed include miniatures of railway locomotives in connection with a special contest. The Club stock has been overhauled. Posters and show cards have been used to decorate the Club room. Other meetings have been devoted to Games, and of course the construction of the new Hornby Train layout and operations on it continue steadily. Club roll: 26. *Secretary:* S. W. Simmons, 37, Derwentwater Road, Acton, London W.3.

Barnard Castle M.C.—More space is now available, and excellent models built have included a fine cargo vessel, a workshop and a railway breakdown crane. A Track Gang has been formed for the purpose of taking care of the Club's Hornby Railway, which has been improved by the introduction of many accessories. Members of the Branch have been engaged in making scenery. Models are being built, and a special layout is being developed, for use at an Exhibition that is to be given. *Secretary:* R. Churchill, The School, Barnard Castle.

AUSTRALIA

Melbourne M.C.—Members of the Club helped to arrange a display of Meccano models and Hornby Trains at a Hobbies Exhibition in Preston Town Hall on behalf of a fund for British Bombing Victims. The Mayor of Preston, who opened the Exhibition, commented favourably on the size and high standard of the exhibits. A model grain elevator has been built and operated by members. The Leader puzzled members by a train that ran in a locked room, but was under complete control. The secret was not revealed to members, who are eager to solve the mystery. At other meetings timetable operations have been carried out, and on one occasion 10 trains were included in the running programme. Club roll: 12. *Secretary:* L. Ison, 8, Hayes Street, Northcote, N.16, Victoria, Australia.

NEW ZEALAND

Ashburton M.C.—Steady work continues. A new Meccano Set has been purchased for Club use. Keen interest is taken in the Annual Model-building Contest with the Christchurch M.C., the present holders of the Shield competed for by the two Clubs. Ashburton M.C. were leading at the end of the first half of the present year, and are keen to win the Trophy for 1941. Club roll: 50. *Leader:* Mr. G. C. Bishop, 103, Eton Street, Ashburton, New Zealand.

Branch News

Rochdale and District.—This Branch has now received incorporation. A good track has been laid out, and splendid operations with 10 engines and 32 trucks have been enjoyed. During a railway visit a locomotive was examined and a signal box inspected, the working of points being carefully explained. A Magazine is to be published, and each member is to be asked to contribute. *Secretary:* A. Morgan, 5, Ash Grove, Rochdale.

Beech Hall (Macclesfield).—The first meetings of this newly incorporated Branch have been very enjoyable. Express passenger services have been arranged, with a Hornby "Royal Scot" and an L.N.E.R. 4-4-2 as locomotives. Goods services also have been run. The layout incorporates a terminal station, with a halt, and new tracks are being planned. *Secretary:* J. Cheetham, Viarbye, Barlow Road, Romiley, Cheshire.

Elgin.—Railway operations are the main features of the weekly meetings. Meccano Model-building also is carried on and other pursuits followed include Stamp Collecting. A very successful Exhibition has been held, and a further display and a cinematograph show are being arranged. An excellent Library of railway books and magazines has been formed. *Secretary:* L. M. Hay, 175, High Street, Elgin.

Rockport (County Down).—Splendid progress is being made, 12 new members having been enrolled. The layout is temporary, but is satisfactory in use. Cardboard scenery has been made, and lineside features now under construction include mines and quarries, to provide coal and stone as loads, and a saw-mill to deal with logs transported from the forest that forms part of the surroundings of the layout. *Secretary:* T. W. U. McMullan, Rockport, Craigavad.



A group of members of the Clapham Common Branch No. 389, Mr. S. Salmon, Chairman, K. Maycock, secretary. In our photograph Mr. Salmon is in the middle of the back row, and Mr. L. E. Mason, Vice-Chairman and General Manager, is on the right of the middle row, with the secretary on his right. The Branch was incorporated in March 1940, and an excellent layout has been built up on which enjoyable time-table operations are carried out. A very successful magazine is issued monthly.

Ackworth School.—It was decided to relay the track, and several designs were considered before this was done. Meetings are now held weekly, and when the track is completed new members will be accepted to make sure that all posts are filled during operations. *Secretary:* J. Mayo, Ackworth School, Ackworth, Yorks.

Seaton Delaval.—A large track has been laid down, and operations of an interesting character carried out. At one meeting the running of goods and passenger expresses was the chief feature; at another stopping trains were worked on a single line, providing various connecting services. The track and all accessories were completely overhauled at a third meeting. More members are required. *Secretary:* S. O'Donnell, 104, Astley Road, Seaton Delaval.

West Hunslet.—Successive meetings were devoted to shunting operations and to extensive relaying. Local passenger services also have been provided on the layout. A new electric layout has been brought into use, and a scheme for providing automatic control is under consideration. Mr. G. Hodgson, secretary of the York Branch, paid a welcome visit, during which he explained the layout of the York Branch track and described operations on it. *Secretary:* W. Hall, 20, Addington Street, Dewsbury Road, Leeds 11.

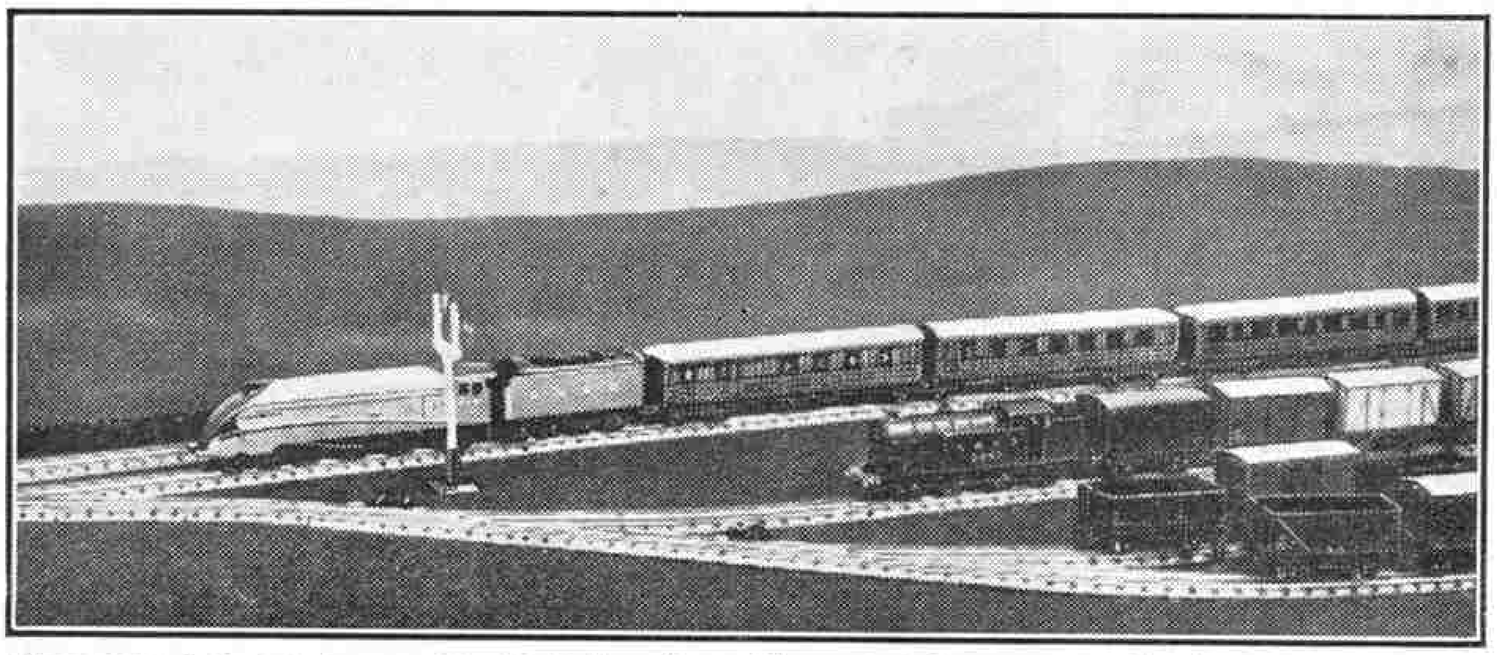
Dunblane.—Busy scenes have been witnessed at meetings, the running of trains and the marshalling of goods rolling stock being carried out in a very realistic manner. A loopline has been constructed at the main station. A new signal box to house all the point and signal levers has been planned, and it will be constructed after certain necessary alterations to the track itself have been carried out. A Social Evening has been held, at which Mr. J. Williamson, Leader, gave a talk on signalling and railway yarns were exchanged. *Secretary:* J. Williamson, Jun., Backcroft, Dunblane.

Goudhurst School.—The stock has been overhauled and a new track laid down. A new secretary also has been elected. Enjoyable meetings are now being held, and members are showing more keenness in operations and generally in Branch working. *Secretary:* D. B. Giesner, Goudhurst School for Boys, Bethany, Goudhurst, Kent.

For Hornby-Dublo Enthusiasts

Special Traffic and Unusual Trains

IN our Dublo article last month we described the locomotive working arrangements for hauling a series of trains giving a regular service on a Hornby-Dublo layout. In addition to traffic that has to be handled according to regular working timetable requirements, the miniature railway "Manager" may introduce attractive variations into his operations by imagining traffic demands that make it necessary to run special or unusual trains. In this article we deal with various services of this kind.



Passenger and goods trains on a Hornby-Dublo railway. The goods train represents a "perishable" traffic special as described in this article.

Special traffic has not only to be fitted into the working scheme without upsetting regular trains, but also has to be provided with the necessary rolling stock and engine power. If a spare engine is not available, the special working will provide an extra item of duty for one of the engines already at work. "Light engine" running may be necessary in order to work a locomotive from point to point either before or after the special run. Similarly the vehicles composing the train may have to be worked in one direction as "empties" so that they may be available when required for the special run or to be ready after it for the next regular train. The exact details naturally will vary with each.

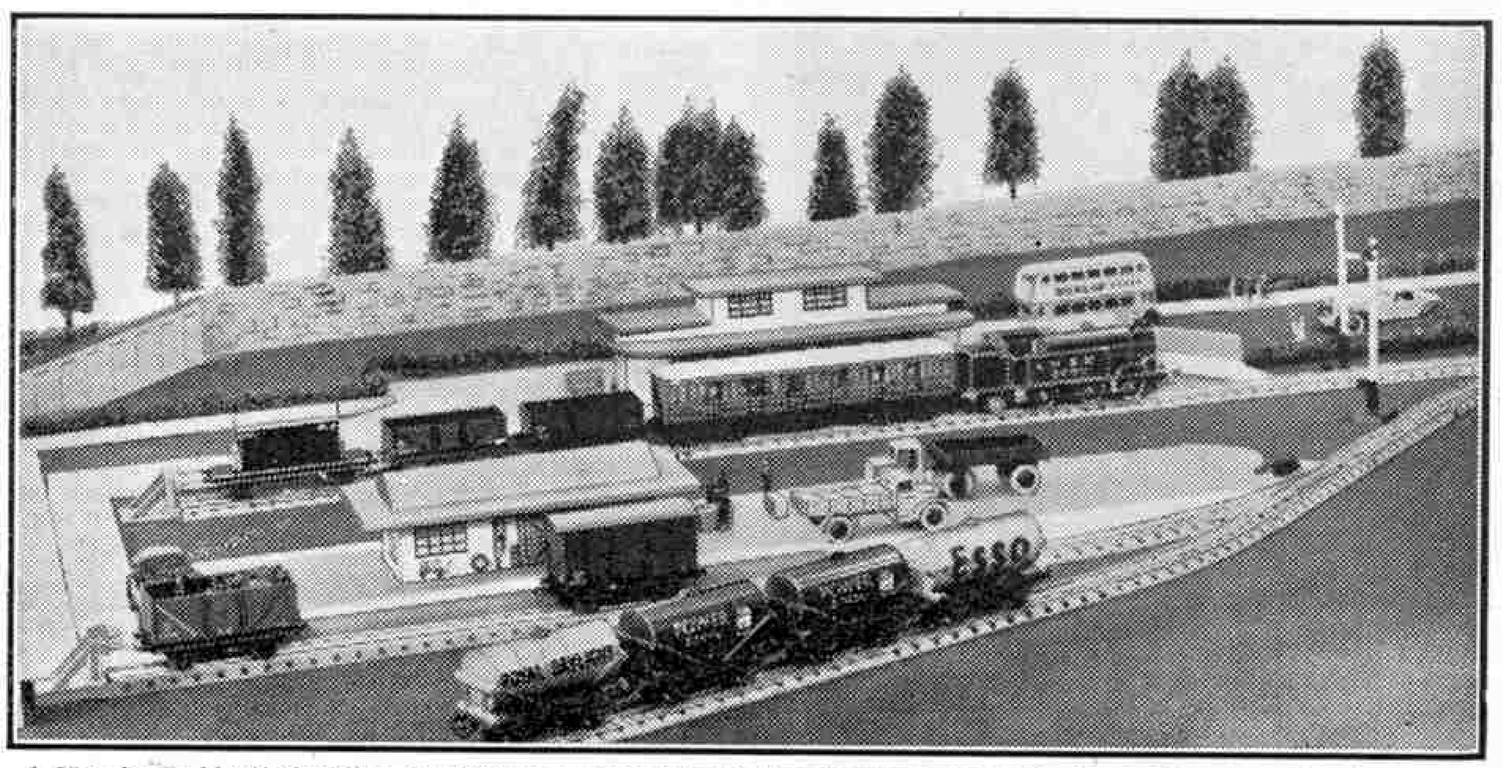
The wagons or vans employed will depend on the nature of the special traffic that has called for the running of the train. The conveyance of foodstuffs, for instance, is always important, and here the Dublo Meat Van, Fish Van and the ventilated 12-ton Goods Van can all be used together if the "load" is miscellaneous or if rolling stock is limited. On an extensive system with plenty of vehicles a complete train of, say, Meat Vans might be run. A train of Vans representing a "perishables" special is shown in the upper illustration on this page waiting for the signal to start.

For engine power, as we saw last month, it is not an unusual thing nowadays for a streamlined 4–6–2 to be seen on an express freight train, so that the splendid Hornby-Dublo streamlined "Sir Nigel Gresley" can be employed, especially if the run is supposed to be a long one. Alternatively the handy standard 0–6–2 Tank can be used, at all events for part of the journey. It would be interesting to arrange for a change of engines to take place at some intermediate point in the run.

One possible scheme would be for a Tank to do the work over the earlier stages of the journey from the supposed loading point to a concentration yard where additional Vans could be taken on. Then for the main line run the 4–6–2 could take charge, and finally the last stage of the run, perhaps to distribute the Vans to different points, might again be a Tank engine job. Operations of this kind are carried out every day in real practice.

Similar locomotive working arrangements might be made for other kinds of special traffic working. Suppose we have a cattle special to run. If we have several Dublo Cattle Trucks it is unlikely that they will all be concentrated at one place. So we have to work them "empty," either by means of a pick-up goods train or even by attaching an odd vehicle to a passenger train, to the station where they are required. Even in real practice quite a small load may be seen on a cattle special so that the miniature train shown in the upper illustration on the next page is quite reasonably made up of two Cattle Trucks and a Goods Brake Van.

Among other specials there may be coal trains, and for composing these on a Dublo railway the High-Sided Coal Wagon is the first choice. This represents the standard 12-ton mineral wagon in common use on the L.M.S. and the L.N.E.R., and it can be supplemented by the ordinary Coal Wagon. Each of these Coal Wagons has a realistic load of imitation coal. At times of special "traffic pressure" the High-Capacity



A Hornby-Dublo "mixed" train about to leave a branch line terminus. Note the Tank Wagons in the foreground on the siding reserved for this kind of traffic.

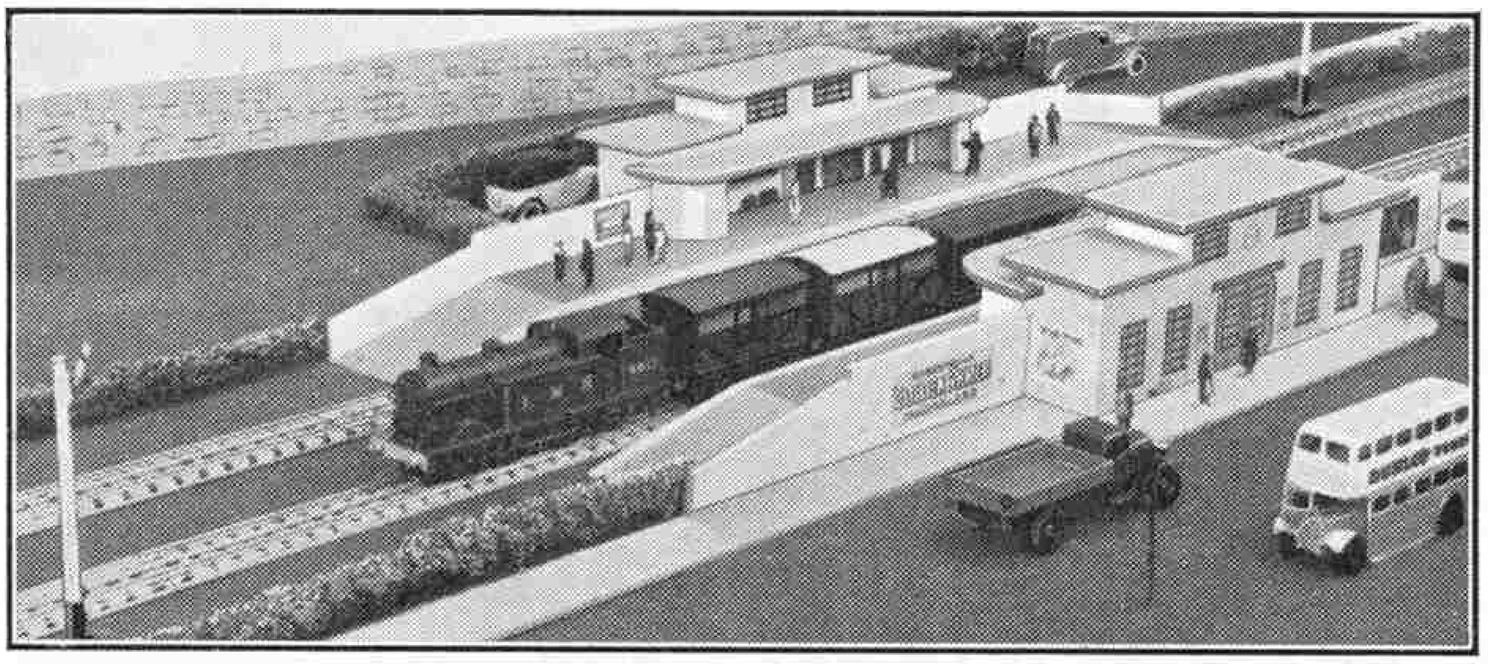
Wagon, which represents a bogie vehicle of 30 tons capacity, can also be pressed into service. Although really intended for brick traffic, as the marking of its sides indicate, the High-Capacity Wagon can also be used for coal traffic, stone and similar "rough" freights.

Bricks are in great demand nowadays and a "brick special" would be an interesting train to represent on a Hornby-Dublo railway. In addition to one or more Brick Wagons, the Open and Coal Wagons also can be used, the imitation loads being removed and a load of "bricks" substituted. This can be arranged by making a cardboard shape like the lid of a box that will fit neatly into the wagon body. This can then be painted red and lined to represent a cargo of bricks. Ordinary water colour paints and pencil lining will be quite satisfactory.

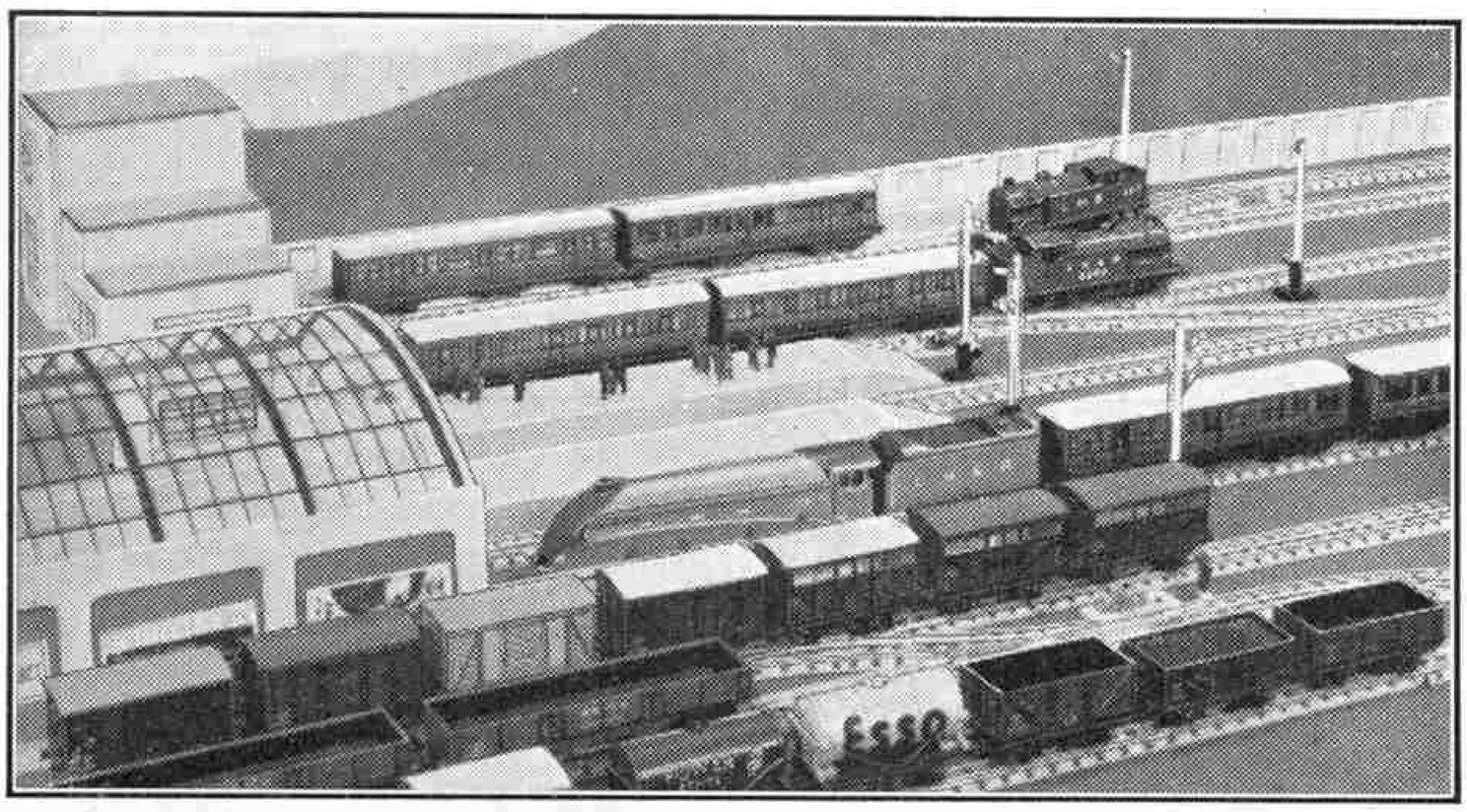
Petrol and oil specials will give plenty of employment for the attractive Dublo Tank Wagons.

In addition to special traffic a great deal of fun can be enjoyed by running trains that are unusual in some respect. Local traffic of the lighter kind, as opposed to the familiar suburban "rush hour" operations, can be dealt with very effectively by means of "pull and push" train. These consist as a rule of one or two coaches and in the one direction the engine travels normally pulling its train. For the return journey the engine is not uncoupled and "run round," but pushes the coaches. The engine is then controlled by special means from what is now the leading end of the train where a driving compartment is arranged. When the engine is trailing therefore the driver rides in this compartment, the fireman remaining on the footplate.

For "pull and push" operations on a Dublo layout the Articulated Unit can be employed to form the train and the engine will of course be the useful 0–6–2 Tank. The guard's and luggage compartment of the composite vehicle of the Unit can be supposed to contain the "remote control" driving arrangements, so that the engine should be attached at the other end of the train. A "motor train" arranged in this way will form a useful unit for light suburban or branch line traffic. Running round at the end of each journey is done away with, and the length of platform necessary for a train is reduced. This is quite an advantage, particularly at a junction station where the branch train is accommodated at a "bay" platform as in the lower illustration on this page.



A cattle special. Hornby-Dublo Cattle Trucks have a most realistic appearance with the characteristic openings at the top of the sides.



A junction station with accommodation for branch line trains at the "bay" platform on the far side. The branch line train is operated on the "pull and push" principle.

When not required for "motor train" working the engine can deal with whatever goods traffic there may be on the branch line, and it can also shunt and make itself generally useful in the yard of the junction station.

Another method of train working that is found on branch lines and on local "light" railways, is the running of "mixed trains." These consist of both passenger and goods vehicles, an arrangement that allows the traffic to be handled with the least possible number of engines "in steam." A railway of this kind is invariably laid with single track only and the lineside equipment is of the simplest kind. A scheme on these lines can be worked out in addition to the usual main line system, or perhaps, in the case of portable railways, as a change from the normal course of operations.

In the make-up of a mixed train the passenger stock, usually one vehicle only, is attached next to the engine; then follow one or two goods wagons or vans, and to complete the train a goods brake van can be added at the rear. In miniature a mixed train has an unusually fascinating appearance as will be seen from the lower illustration on the previous page.

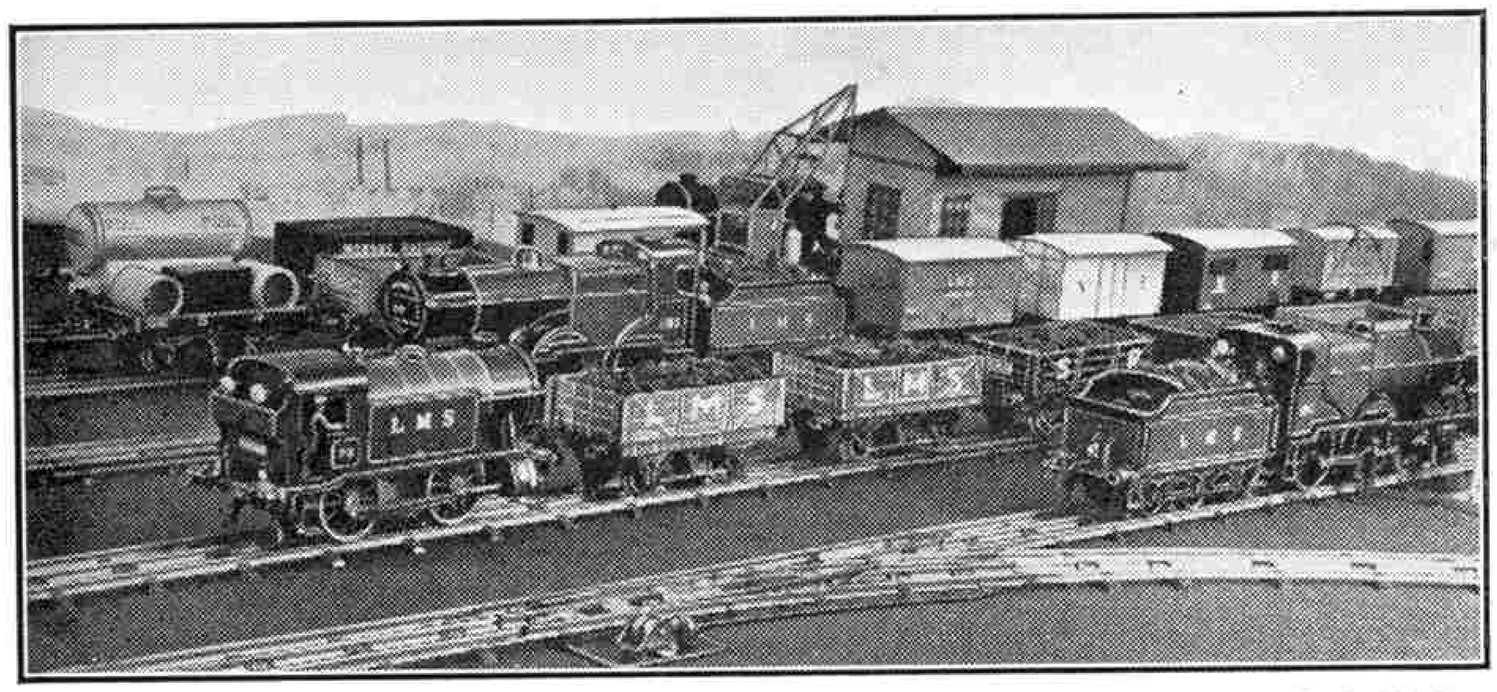
Another type of mixed train that is sometimes seen on main lines consists as a rule of a number of passenger vehicles next to the engine, followed by quite an ordinary assembly of wagons. Such a make-up makes one wonder what is going on. Actually the passenger vehicles are empty and are being worked down the line to the shops for overhaul.

Where a complete train of passenger coaches requiring overhaul can be assembled, this is done. Such a train does not differ greatly from an ordinary train except for the unusual combinations of vehicles that are sometimes seen. Similarly, empty carriage working in and out of terminal stations in connection with normal services at times accounts for strange mixtures of stock, goods or "perishable" vans or horse-boxes being included in between corridor coaches.

Fun With Your Hornby Railway

Getting Ready for Christmas Traffic

ABOUT this time of the year most Hornby railway owners begin to look forward to an enjoyable spell of railway operation during the Christmas holiday. In most cases it is the custom to give the railway a special cleaning up in readiness for "Christmas traffic," and in this article we deal with various points that require attention on either permanent layouts or on portable railways that have to be put away when finished with.



A busy yard on a Hornby railway. The background scenery provides a realistic setting for the Goods Platform and the various trains in the yard.

On a permanent line, examinations, adjustments and cleaning are generally carried out at more or less regular intervals, so that probably little more than a general clean up will be necessary. Where stock, track and accessories have to be put away after each period of running, however, they are more likely to require attention. This is particularly so with the track which, when laid on the floor, as it has to be on most portable lines, is liable to damage. Also the frequent connection and disconnection means a great deal of handling and unless special care is taken it is possible for damage to occur during the period of storage.

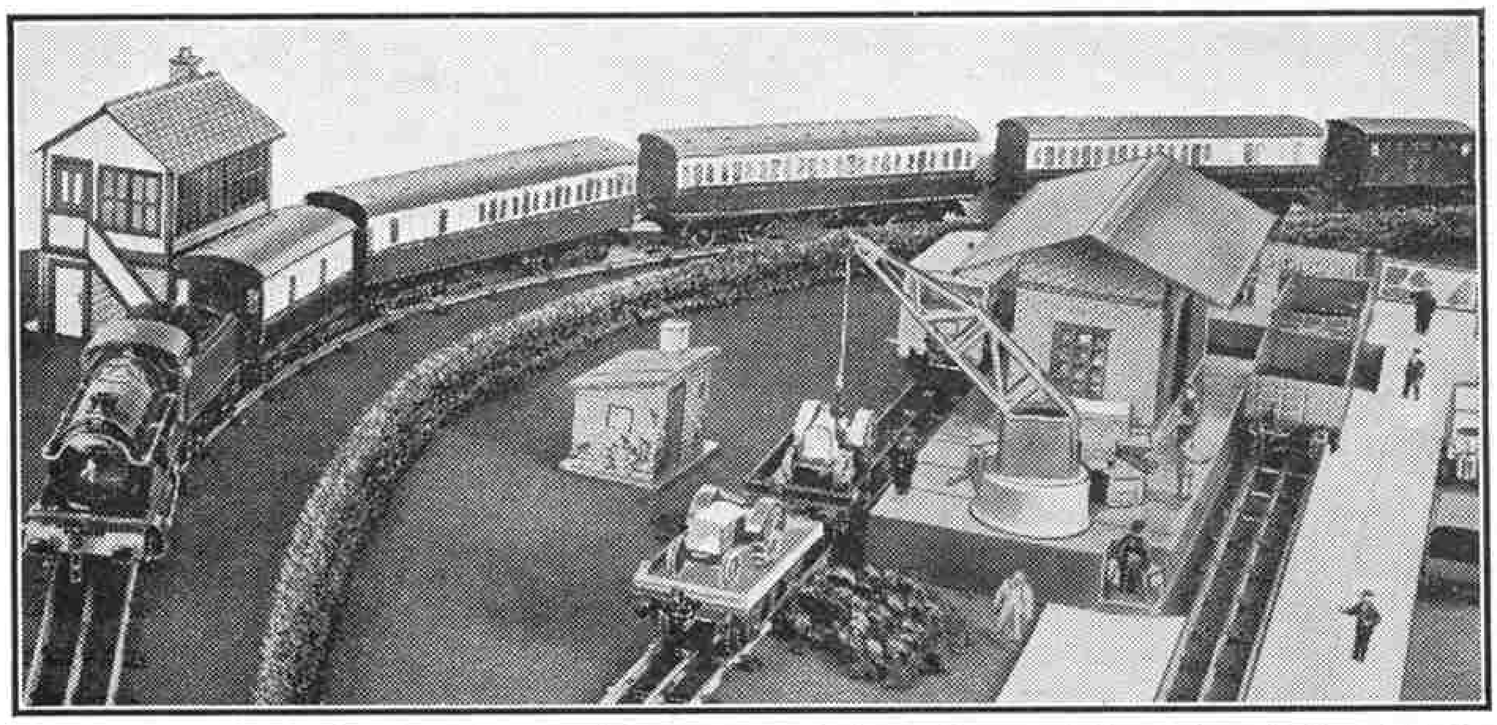
Whichever type of layout we have, it is best to clean the rails first. All model railwaymen will be familiar with the oily deposit that invariably collects along the inner edge of the rail head. Whether this is moist, or a dry caked-on deposit, it hinders the running of the trains, in the first case by causing the engines to "slip" and in the second by increasing the "drag" on the wheels. A clean dry rag rubbed along the rail heads will deal satisfactorily with slight oiliness, but if the deposit is well caked on, a slight moistening of the rag with petrol is advisable. Paraffin should not be used for this purpose; it will remove the deposit, but when dried off it always seems to leave a greasy film on the rails that causes slipping and loss of power with the engines. Sandpaper or emery cloth should never be used on the rails; in time they remove the protective coating on the rails and render them liable to rusting when not in use.

Once the rails are clean they should all be examined, particularly if the layout is of the portable type. Rail ends may get slightly damaged, and from frequent connection and disconnection the hollow rail ends may be a little distorted. A small pair of pliers is useful for any adjustments required. Where any of the rail connecting pins of tinplate rails are loose they should be tightened up again by squeezing the web or the flat centre part of the rail section immediately underneath the pins. Any hollow rail ends that require treatment in a similar manner should have a spare rail connecting pin inserted in the hole in order to prevent the latter from being closed up too tightly or deformed.

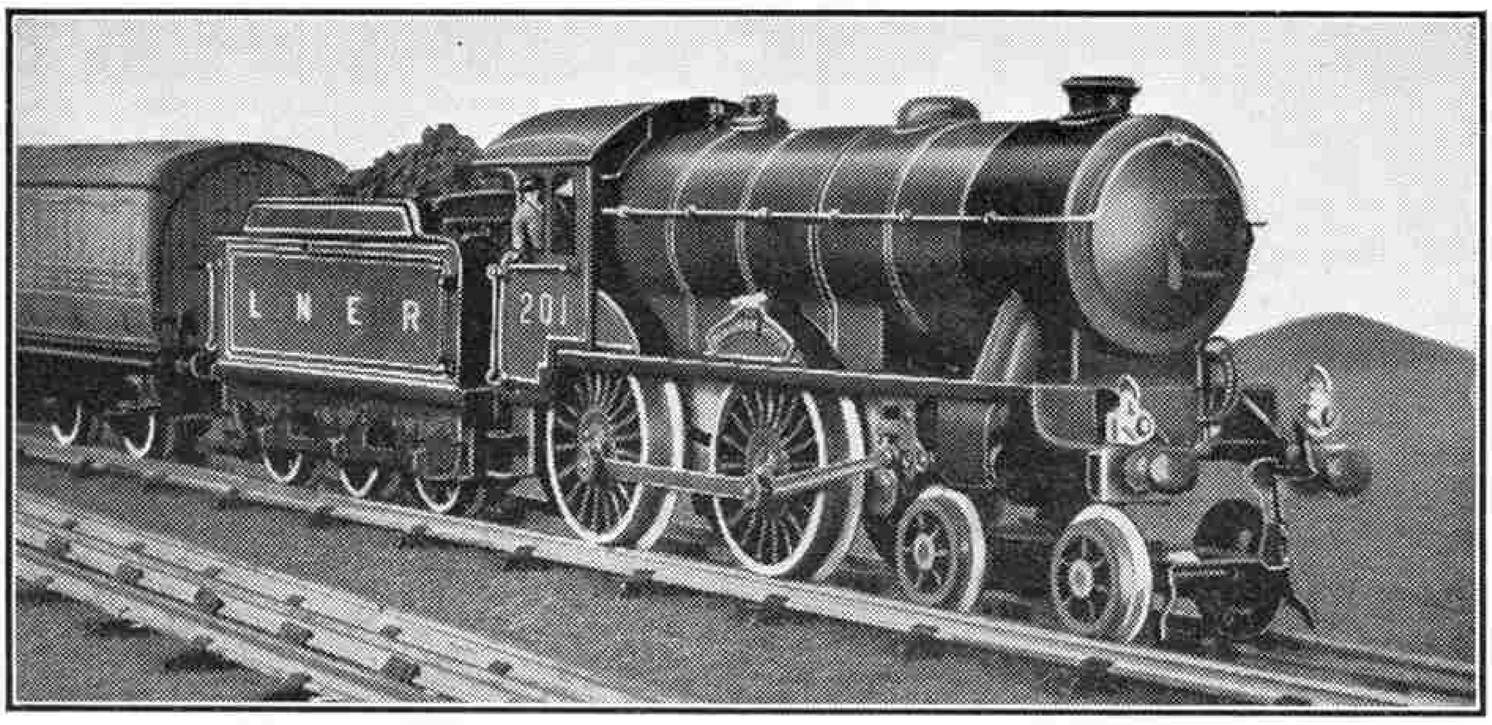
The gauge of the rails should be tested by means of the combined Screwdriver, Spanner and Rail Gauge that is packed with Hornby Locomotives. The rail gauge portion is slid along between the rails and will show up any tight spots immediately. If any are found the rail should be eased gently apart at the points concerned. Curved as well as straight rails should be tested, and the curves should be examined specially to see that no kinks have developed that would give a jerky sideways motion to a train.

Points also require attention, particularly the moving or switch rails. Special care should be taken to see that the leading or tapered end of each switch rail is hard up to the fixed or stock rail in either position of the points lever. Similarly the trailing ends of the switch rail units should be in perfect alignment with the fixed rails at their end of the points. A slight bending this way or that will frequently make all the difference to the smoothness of running.

Crossings, Level Crossings and other track parts such as Turntables should be treated in a similar manner



An interesting corner of a simple layout, with a passenger train passing round the goods yard situated inside the main track circuit.



One of the best-known Hornby Locomotives, the L.N.E.R. "Hunt" class model "The Bramham Moor." Attention to the locomotive as detailed in this article results in improved efficiency in operation.

to ordinary rails. The Rail Connecting Plates should also be looked over, particularly when the railway can only be put down temporarily. Any slackness in fitting is usually due to the back or base of the Plates becoming bent so that the Plates do not grip properly.

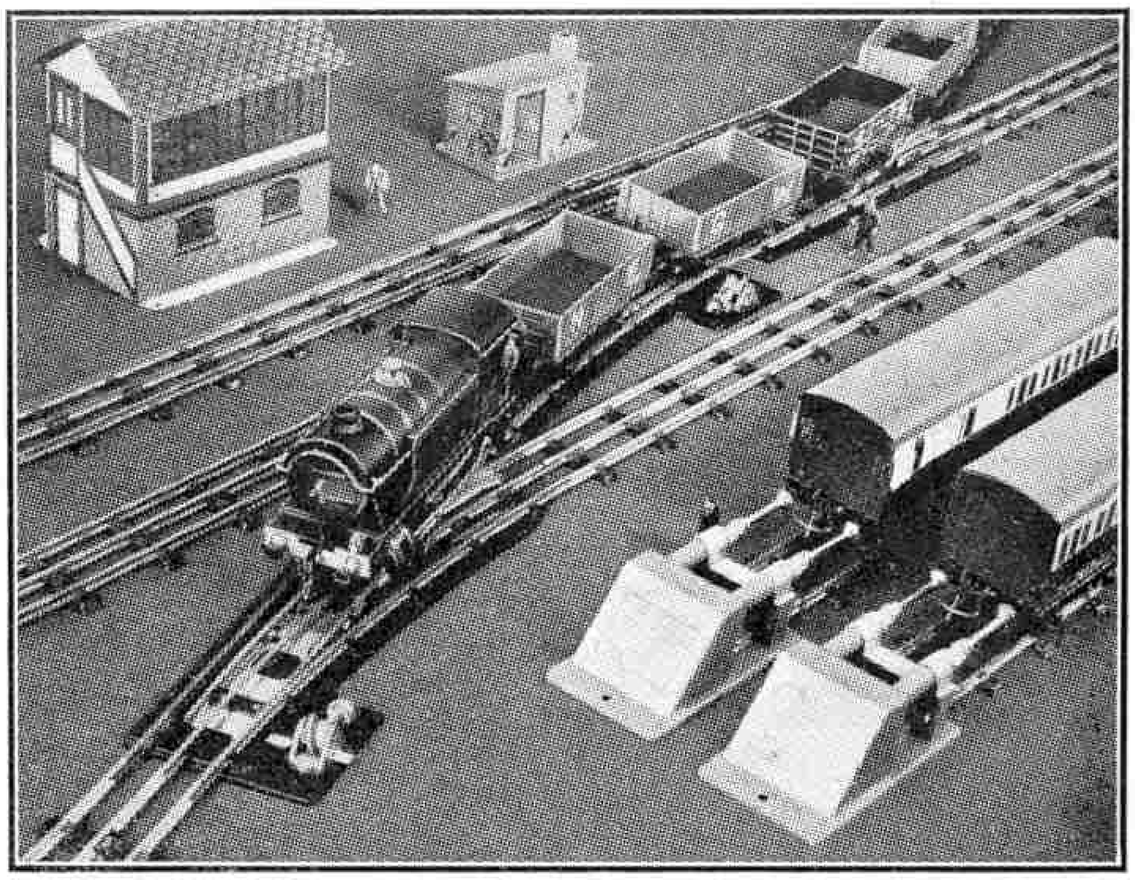
Where Hornby Solid Steel Track is in use there is less chance of any deformation of the rail itself having occurred. Each piece of rail should be examined, however, special attention being given to the fitting of the switch rails of the points. On temporary railways laid with this type of track the fishplates may have become slack through the repeated parting of the rails after running operations are over. Such fishplates therefore should be removed from the rails and very gently squeezed with pliers to close up the gap along the top of each. This is best done by using the pliers at the centre of each fishplate, not by attempting to close up the gap by working from one end.

It probably will be found that some of the sleepers have had the enamel coat worn off in places. Such places should be patched with black enamel.

Now we can turn our attention to the locomotives and rolling stock. To a certain extent the wheels of these tend to collect round their treads a deposit similar to that found on the rails, and a clean dry rag will remove the accumulated "mud." This can be done by turning the vehicles upside down and revolving the wheels slowly with one hand while the rag is held in the other. Where the amount of stock is large it is probably better to remove the wheels and deal with them in turn. This method has the advantage that, while the wheels are off, the wheel frames, bearings and so on can be cleaned. If oily they should be wiped with a rag, but if simply dusty, brushing with a "mop" paint brush kept for such jobs will do what is required.

When the wheels are refitted a little drop of Meccano Lubricating Oil should be applied to each axle bearing; vehicles fitted with axle-boxes can have Meccano Graphite Grease applied to the boxes if preferred. At the same time a general examination of each vehicle should be made, the couplings receiving special attention to see that they can pivot freely and that the hooks are not bent, that they are set to the right level, and that the coupling loops work easily.

A great deal of the dust and grit that locomotives pick up on their working parts can be removed by the use of a "mop" paint brush already referred to. This can be used to "dab" petrol into the inside of a clockwork mechanism that has become dirty. While this operation is in progress the wheels should be turned in order to work out the dust from the moving parts. Coupling and connecting rods on the bigger engines can be removed; this makes it easier to wipe clean the rods themselves and to deal with the coupling rod pins and so on. Engine bogies can be removed and cleaned separately, and the underneath of the footplating generally brushed or wiped clean. It is not a bad plan to stretch out the bogie spring a little when these overhauls are taking place so that it is compressed slightly when the engine is standing on the rails. This assists the riding of the engine and prevents the bogie from running noisily.



A local goods train crossing over from a branch line on to the main track. This illustration includes an interesting layout of Hornby Solid Steel Track Points.

For Hornby Electric Locomotives the various points dealt with in the instruction leaflets packed with the engines should be attended to. Cleanliness is of great importance for efficient working with electric engines. The commutator should be cleaned as described, the collector shoes should be wiped and the brushes examined to see that there is no chance of their sticking in the brush holders. Moving parts such as axles, coupling rods, etc., should be dealt with preferably with the "petrol mop." Any readers who are handling a *"Princess Elizabeth"* model are advised not to attempt to dismantle the outside motion. This can be brushed or rather mopped, and the various pin joints re-oiled very sparingly when the rest of the engine is being lubricated.

The outsides of locomotives and rolling stock will probably need dusting and generally cleaning up. Here again the dry "mop" paint brush will be useful for getting into corners. When all items are clean they can be polished up very effectively by means of a good quality wax polish.

Lineside accessories of various kinds should be looked over, particularly those of the working type such as Signals, Platform Cranes, etc. These will need to be dusted and their working parts lightly oiled even if there is no adjustment or straightening up required.

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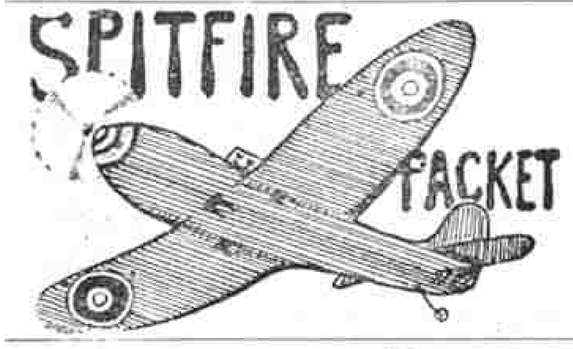
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South Hackney, London E.9 Established 1880

★ FREE ★

Send immediately for our **December Packet** which you can have **ABSOLUTELY FREE.** This packet contains a marvellous collection of COLONIAL, PICTORIAL and COMMEMORATIVE stamps including this attractive two-coloured and scarce Queen Victoria stamp of **LEEWARD ISLANDS** as well as Easter Rebellion commemorative of **EIRE**; a handsome **Duke of Windsor** stamp which was only on sale for a short time; a Commerce & Peace issue of **FRANCE** which is now off sale; an Indian Native State Official from **GWALIOR**; as well as **GERMANY** (Hindenburg); **AUSTRALIA** (Queen Elizabeth); **NEW ZEALAND** and **STRAITS SETTLEMENTS**; **BURMA** (First Issue); **AUSTRALIA** (King, Kangaroo and Ostrich) and **ITALY** (Historical Commemorative). **SEND US** 3d. stamps to cover posting costs and we will **SEND YOU** a Bargain Approval Selection with this wonderful packet **FREE.**



Windsor Stamp Co. (Dept. M), Uckfield, Sussex

FREE! GRAND TRIANGLE "SNAKE" PACKET

Special **CHRISTMAS OFFER** of 21 fine stamps from **ST. THOMAS & PRINCE ISLANDS**, Eire, set of two scarce **BURMA** (overprinted), Victoria (very old), beautiful pictorial **ICELAND** (Codfish), stamps from **LATIN AMERICA** and Mohammedan Lands, Jugo-Slavia, old Spain, a special **FINE LARGE PICTORIAL STAMP** (surprise item), Great Britain (scarce **LION** issue), etc., etc., and, finally, as an extra Christmas Gift, I am including a **GRAND TRIANGULAR MOZAMBIQUE STAMP** printed in two colours, with picture of a snake.

This fine collection will be sent **ABSOLUTELY FREE** to all collectors sending 3d. to cover postage and asking to see my special **"MERCURY"** Approvals. **PHILIP J. DYKE**
35, Buckleigh Avenue, Merton Park, S.W.20

FREE—2/6 GT. BRITAIN K.G.V

This scarce high value stamp will be given free to all genuine applicants for our famous ONE PENNY Approval BOOKLETS of BRITISH COLONIALS. These Booklets abound with JUBILEES, CORONATIONS, large BI-COLOURED PICTORIALS and the latest KING GEORGE VI stamps. The best value on the market and every stamp an investment—no worthless foreign stamps. N.B.—Enclose 2½d. for Postage.

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'SEVENOAKS SPECIAL' 2/6 EACH COUNTRY

All face diff. Postage extra. Larger pkts. if required.

19th Century 50, K.E.VII 40, K.G.V 65, K.G.VI 60, S. Jubilee 20, Australia 40, Canada 50, Ceylon 35, Cochin 35, Burma 21, Egypt 40, Eire 30, F.M.S. 25, Gold Coast 20, Gt. Britain 50, Hong Kong 25, India 50, Iraq 35, Jamaica 30, Kenya 25, Newfoundland 25, New Zealand 50, Nigeria 20, Palestine 30, S. Leone 19, Str. Setts. 30, Tr. & Tobago 20, Trans-Jordan 19.

Ask for Complete Lists of Packets, 1/- to £5.

FRED HARLOW, B.P.A.
133, BRADBOURNE VALE, SEVENOAKS, KENT

HERE'S LUCK FOR BOYS! Packets of 25 mixed stamps for 1/-. Approvals on request. Cash with order and stamped addressed envelope. F. J. B. Crowder, 144, Chapeltown Road, Leeds 7.

FREE! "ATLANTIC CLIPPER" FREE!
I do not think that you will have the 30 cents United States Air Mail stamp as used on letters per "The Clipper." However, to all applicants who send 2½d. to cover postage and ask to see a selection of my "WORTH WHILE" approvals I will present ONE gratis.

JOS. H. GAZE, 10, Pimlico Road, CLITHEROE, Lancs.

BRIGHTEN THE BLACK-OUT

with one of our approval selections. Please state interest and if medium or advanced.

E. & N. GREY, 9, ROSEMARY AVENUE HOUNSLOW

STAMPS BOUGHT AND SOLD. State price required. Glanville, Cawsand, Plymouth.

My Approval Books **GO OUT FULL** of
MODERN BRITISH COLONIALS
mostly short sets, with each stamp priced singly from ½d. and **COME BACK NEARLY EMPTY.**
For these attractive stamps send a P.C. to
G. MOAT, 39, SHELVERS WAY, TADWORTH, SURREY

100 DIFFERENT STAMPS FREE

to applicants for ½d. approvals.

COX, 17, STONELEIGH PARK ROAD, EWELL

MINT STAMPS POST EXTRA

Australia, Imperial Forces, 4 for 3/6; Canada, Royal Visit, 3 for 1/-; Greece, Albanian occupation, 10 for 2/-; Hong Kong Centenary, 6 for 4/-; Nauru, Silver Jubilee, 4 for 4/9; Papua 1939, 5 for 2/10; South Africa, Huguenot, 6 for 2/-; South West Africa, Huguenot, 6 for 6/-; Southern Rhodesia, 1940 Jubilee, 8 for 4/3; Ceylon Prov. 3c. on 6c., 3d. each.

HARROWVEN (MM), 29, Berners Close, NORWICH

GREAT BRITAIN

Postally used 2/6 and 5/- King George V, now scarce, sent free to all genuine applicants for approvals enclosing 2½d. postage. Only one gift to each applicant.

Mention "Meccano Magazine."

R. D. HARRISON, Roydon, Ware

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75 Different Foreign and Colonial Stamps selected from Collections presented to Hospital. Send 6d. and stamped addressed envelope to:
SECRETARY,
Memorial Hospital Hall, Woolwich, LONDON S.E.18
An approval sheet from our limited number will be sent on request.

A FEW ATTRACTIVE BARGAINS

CORONATIONS: Complete 202 values, mint 42/6 (mounted in album 46/-), used 52/6. **CROWN COLONIES:** 135 values, mint 19/6, used 22/6. For Coronations and Jubilees (single sets) ask for special list. **GREAT BRITAIN:** K.G.VI, 2/6, 5/-, 10/-, superfine copies—4/-. **NEW ZEALAND:** Chamber of Commerce, mint 3/-. **MOROCCO:** Edward VIII, 11 values, mint 1/-. **WESTERN SAMOA:** 1939 Stephenson complete, mint 12/6, used 13/6. **ZANZIBAR:** Jubilee mint complete, 2/-. **AUSTRALIA:** K.G.VI £1, used 9/-. 100 different Pictorials Whole World, 4/3 per packet.

Postage extra on all orders under 10/-. Cash with order.
Want lists solicited.

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For SERIOUS COLLECTORS

Our Bargain "Discount" Approvals contain a fine range of picked Modern and New Issues, Pictorials and Commemoratives, etc., from 1d.—6d. each, less a generous discount. (General selections only). Approvals or details are post free, and we do NOT send again unless requested. State whether you want British Colonials, Foreign or both. **POSTAL BUSINESS ONLY**

THE BIRKDALE STAMP CO. (P.T.S.),
Dept. M, 104, Liverpool Road, Southport, Lancs.

For other stamp advertisements see page 396

STAMP COLLECTING

Explaining the Stamp Collection

WE promised last month that we would devote our next talk to "writing up" the stamp collection. We have never really cared for the expression "writing up"; it sounds almost frightening to the young collector in its suggestion of laborious study and preparation of details. Actually the process is nothing more than giving a simple description of each stamp, explaining it and its purpose, so that all who look at the album may understand what it has to tell them. And what a difference this makes!



DOMINICA: June 1918, ½d. Issue of 1908-19 overprinted for compulsory war tax use.

The amount of descriptive matter to include, its nature, and the style of writing, plain or decorative, must be decided by each collector for himself. But there is one golden rule—every word must have its purpose. Each fact must be stated as briefly as possible, for after all the stamp is the important thing, and the accompanying words are merely supplementary. Sometimes, it is necessary to explain some particular stamp at length, however, and this should have a special page devoted to it. If it is not important enough to justify such prominence, it is not important enough to justify a long explanation.



NEW BRUNSWICK: 1860-63, 5c. yellow-green. Perf. 12.

The facts that are essential for every stamp are the country and date of issue, the watermark if that is different from the one usually employed by the country, and the perforation gauging. The illustrations accompanying this article show how the writing-up of individual stamps should be carried out, the simple captions under them giving the essential facts for each. If these facts are common to several stamps, as for example the complete set of a particular issue, they should go at the head of the page, where the name of the country will go automatically.



STRAITS SETTLEMENTS: Trengganu: October 1917 Red Cross Issue, 2c. on 8c. Issue of 1910-17 surcharged.

There are occasions when stamps that are part of a series first appeared on different dates. Great Britain's new stamps in lighter shades, which are now being issued at intervals, are examples of this. In such cases details that are common to all stamps in the series should be placed at the head of the page and those that are special to individual stamps should be entered immediately above that particular stamp. Thus the heading for the page devoted to these lighter wartime stamps of Great Britain would have four lines in it, as follows: *"GREAT BRITAIN"*; "1941-42 *Wartime Issues of King George VI*"; *" Lighter Shades employed to save Dyestuffs"*; *"Designs as 1937 Issue."* Then would follow, in order of appearance, not of value, the stamps that have already been issued, and later issues as they become available. The date of issue should be written above each stamp.



ST. HELENA: 1912-16, ½d. Wmk. Multiple Crown CA. Government House. Perf. 14.



FIJI: 1916-19, ½d. War Stamp. Issue of 1912-23 overprinted for compulsory war tax use.

Before we go further, the general use of the blank page of the loose-leaf album may be dealt with. As we said last month, the great advantage of this type of album is that it permits proper display of the stamps by enabling the collector to use as many pages as he wishes for a particular country. When album pages are easy to purchase, and are not expensive, it is sound practice to devote each page to only one issue, or to two short issues, and not more than 16 to 18 stamps should be placed on the page. If one issue contains more than this number, a second page should be used for the higher values. The stamps should be arranged symmetrically, and the layout for each succeeding page should be different from the next, so that monotony is avoided as the album leaves are turned over. No two succeeding rows on the page should contain the same number of stamps.

Unfortunately album leaves are not easy to get at present, and they are expensive. Reasonable economy, therefore, is essential, but it is not necessary to carry the economy to the point of crowding the album pages. The number of stamps on the page can be increased to from 30 to 36 and the symmetrical arrangement still retained. All the stamps of a long issue can go on one page, and perhaps still leave room for a short one at the foot. Provided that care is taken, the increased number of stamps on the page need not create the appearance of a jumble.



GREAT BRITAIN: 14th September 1936, 1d. Pair showing freak perforation, due to faulty delivery from vending machine.

The principal effect of this will be to make compression of the "writing up" even more important. With this in mind it is necessary to decide beforehand just what is to be written. The wording should be jotted down on paper first, and then studied to see whether it can be shortened without spoiling the sense. We carry this idea rather further, by deciding on the wording of our descriptions before even mounting the stamps on the page, so that the little panels of wording can be made to fit with good effect into the general design of the page.

If the descriptive matter is very extensive, as it is for several "entires," or complete envelopes, that we have included in our collection, the wording is written on the back of the preceding page, where it faces the envelope to which it refers. We have one album in which almost every specimen will require a description of this length, for it contains entires and stamps that tell interesting stories of post office working in war conditions. In many instances the full facts of the story cannot yet be discovered. For instance, one cover in this growing collection is an air mail envelope posted in Sweden to an address in England. On the back is a cancellation mark, known as a "backstamp," applied in Baghdad! Obviously the letter travelled by way of Russia to Iraq, but how it journeyed from Iraq to England cannot be told until after the war. The story will be one worth setting out in detail, however.

Finally we must deal with the style of "writing up" the page headings and the simple notes. Simple methods are best, and we favour ordinary handwriting for the notes and hand-printed capital letters for the



INDIA: 1937 Pictorial series, 6a. Wmk. Star. Perf. 14. P. and O. mail steamer.

(Continued on page 392)

Stamp Collecting—(*Continued from page 391*)

headings. The collector who is able to add simple embellishments, such as Old English lettering for his headings, should adopt them. They add a touch of personality to the page, and wherever possible the collector should infuse his album with his own personality. It is best always to proceed on cautious lines, and if there is the slightest doubt as to the effect of a particular style, it should be discarded in favour of something simple that can be carried out successfully and consistently. There is nothing so unsightly as an album that starts off ornately and tails off into blotchiness.



GREECE: 1927-35, 80 lepta. Corinth Canal.

Different coloured inks may be employed for different features, but they should be used sparingly to avoid clashing with the bright colours of the stamps themselves. Red ink particularly should be used very little, for if overdone it becomes very distracting and tends to pull attention away from the stamps instead of directing it towards them, which after all is the principal object of "writing up." We use only one colour other than black, a light blue that is used for headings of pages and, only occasionally, for the heading of a special panel of explanatory matter.



A collector who has a good sense of colour could venture on the use of colours. Only a few days ago we examined a collection of air mail stamps in which six colours had been used in writing up and in drawing maps to illustrate the routes of various air services. Every page of the albums sparkled with life, but few could have achieved so successful an effect.

The Prisoners of War Post

One of the less-known activities of the International Red Cross at Geneva, headquarters of the organisations that see to the welfare of the prisoners of war of all countries, is the organisation of mails that keep the prisoners in touch with home affairs. The Red Cross have indexed the names of over seven millions of prisoners, of whom only two millions are civilians. The vast volume of mail passing to and from these prisoners can be readily imagined. Only a small proportion of it is actually handled at Geneva, but even so some 60,000 pieces of mail are dealt with daily.



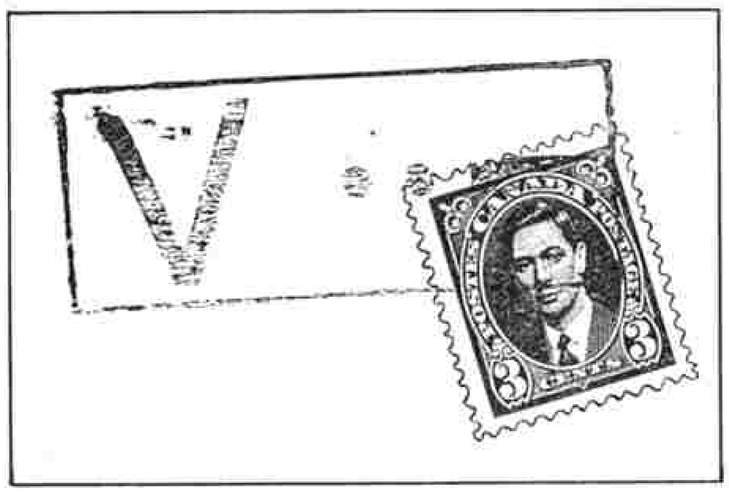
Stamp Gossip

and Notes on New Issues

Irish Rising Commemorative

We illustrate on this page the 2½d. stamp issued in Eire on 27th October to commemorate the Easter rising of 1916. The design represents an Irish volunteer and the building in the background is the General Post Office at Dublin, the first building to be stormed by the rebels.

The seemingly curious postmark faintly visible on the stamp is part of a pictorial cancellation at present in use in Eire. It shows an ear of wheat accompanied by the slogan *"Grow more wheat."*



War Slogan Cancellations

In our last issue we referred to interesting patriotic slogans employed in Canada and this month we illustrate the "V for Victory" slogan. We show also two other interesting items. One is a slogan mark from Australia bearing the timely reminder *"Don't Write about Ships."* The other is the special souvenir cancellation applied to mail posted by the Czechoslovak forces in Britain on 28th October, Czechoslovakia's National Day. This cancellation is in red, and in consequence the postage stamp appears to have been stuck over the cancellation.

The British Post Office Still Leads

Our recent note on the introduction in the United States of the "mailomat," a postal facility that the *"M.M."* forecast several years ago, has led one reader to write to us about the "backwardness" of our G.P.O. There are many features of the service provided by the British Post Office that have no counterpart in the United States, however. For instance, the United States does not provide slot-vending machines that enable one to buy a postage stamp at ordinary prices after the post offices have closed. We have had those in Britain many years. Then the British Post Office will buy back unused current stamps at a small discount, provided the quantity is worth at least £1 and the stamps are clean. This practice is not followed in the States.

A "V" Stamp for Norway

The current photogravure stamps of Norway have been re-issued with an overprint in the form of a large capital V. Thus do the Nazis try to stem the rising tide of the Victory campaign; by adopting the V symbol for themselves they hope to kill its meaning as a symbol of encouragement to the oppressed peoples of the occupied countries of Europe.

New Belgian Issues

News of new stamp issues in enemy-occupied countries still leaks through very slowly and almost all the information available comes via the United States. Recent issues of the American stamp magazines tell of two interesting charity issues from Belgium.

The first consists of 10 stamps bearing portraits of members of the reigning house in the 15th to 18th centuries, when the boundaries of European States were just commencing to assume a settled shape. It gives an interesting glimpse of the vicissitudes of Flanders and the Low Countries, for the portraits include those of Maria Theresa, 1717-80, daughter of Charles VI of Austria, on the 10c. value, Charles of Lorraine, 1712-80, on the 35c., and Margaret of Parma, 1522-86, on the 50c. The other portraits are: 60c., Charles V of Spain, 1500-1558; 1 fr., Joanna of Castile, 1479-1555; fr. 1.50, Philip the Good of Burgundy, 1396-1467; fr. 1.75c., Margaret of Austria, 1480-1530; fr. 2.25c., Charles the Bold, 1433-77; fr. 3.25c., Archduke Albert, 1550-1621; and fr. 5, the Archduchess Isabella, 1566-1633.

The second series was issued in aid of the funds for the restoration of Orval Abbey, the fifth such issue for this purpose. There were 12 stamps in the series, each bearing a premium in aid of the funds, and five designs showing various activities of the monks of the abbey.



New South African Stamps

The new South African war stamps bearing patriotic designs, to which we referred to in the *"M.M."* a month or two ago, are now making their appearance. The ordinary pictorial stamps are appearing in a greatly reduced size as a measure of paper economy, and we hope to have specimens available for illustration next month.

COMPETITIONS! OPEN TO ALL READERS

A LOCOMOTIVE FIGUREWORD CONTEST

December is a busy month for all readers, with the holidays in prospect and preparations to make for the Christmas season, but all will be able to spare time for the easy puzzle we are setting for this month. All that is required is a pencil and paper, and there is the added attraction in the Home Section that the closing date has been fixed so that the winners will receive their prizes, consisting of postal orders, before Christmas itself. In addition to the main prizes there will be consolation awards, so here is a splendid opportunity of increasing pocket money for Christmas.

In the diagram on this page there are seven rows, each consisting of seven blank spaces, and the spaces are to be filled with letters that make up the names of seven locomotive parts when read horizontally. To each letter a number is given in alphabetical order. A being represented by the figure 1, B by the figure 2, and so on, down to Z, the value of which is 26. When these figures are substituted for the letters, the numbers in each row must add up to the horizontal totals marked on the right, and the numbers in the vertical columns must give the totals shown underneath.

F							79
							77
							67
							94
							98
							96
							77
45	103	66	86	84	75	129	
VERTICAL TOTALS							HORIZONTAL TOTALS

Readers are given a start by the insertion of the letter F in the first row. The value of this letter is 6, and the first row has to be completed by letters making up the name of some locomotive part beginning with F, which contributes 6 to the first horizontal total of 79 and to the first vertical total of 45.

Competitors should copy the diagram out on a sheet of paper, a very easy matter, and should fill this in with letters satisfying the conditions of the contest. They must not cut out the diagram on the page; if they do their entry will be disqualified. An entry may be made as ornamental and original as desired, and in the event of a tie for any one of the prizes the judges will take these features into consideration.

Entries should be addressed *"Christmas Figureword Contest, Meccano Magazine, Binns Road, Liverpool 13."* There will be the usual separate sections for Home and Overseas readers, and the lists of prizes and closing dates in these are given in the panel at the foot of the page.

Christmas Price Code Competition

During the next few weeks toy shops and the toy departments of large stores will be happy hunting grounds for all our readers. There they will examine everything, and at the end of these exciting weeks they will know all about the many good things on offer for the Christmas season. We are joining in this splendid game by giving readers an interesting detective problem. This introduces a price code, one of the kind based on the use of a word or phrase consisting of 10 different letters, which in order represent the numbers 0 to 9. In many shops prices marked on tiny cards attached to articles are entered in the code in use in the shop concerned and we want readers to imagine that they are in a toy store, in which the prices in shillings and pence of the articles in the list below are marked in this manner. All they are asked to do is to discover the prices of the good things in the list and the code word used.

This is easier than it looks. A little consideration will soon show what numbers one or two of the letters represent, and this will give the positions of the letters in the keyword. By various other different methods more can be added to these until the word itself is revealed. It will be a great help to keep in mind the values placed on the actual articles, for clearly a tricycle is more valuable than a games compendium, and this will cost more than a packet of balloons.

Tricycle	**TD/D**
Christmas Tree	**PP/A**
Doll	**PU/D**
Dart Board	**UI/S**
Football	**UP/A**
Games Compendium	**E/L**
Aeroplane	**T/UU**
Motor Car	**T/D**
Book	**C/D**
Christmas Stocking	**L/A**
Packet of Balloons	**D/A**

The solution to be submitted should give the code word and the actual prices of the articles in the list. The prizes in this contest are all in cash, and the closing date in the Home Section has been arranged to enable the winners to receive their prizes before Christmas.

There will be two sections, for Home and Overseas readers respectively, and entries in each should be addressed *"Christmas Price Code Contest, Meccano Magazine, Binns Road, Liverpool 13."* Closing dates and prizes are given in a panel at the foot of this page. If there is a tie for any prize the judges will make their award on neatness and originality.

THIS MONTH'S PRIZES AND CLOSING DATES

"Figureword" and "Price Code" Competitions: In each of these contests there will be two sections, for Home and Overseas readers respectively, and in each cash prizes of 21/–, 10/6 and 5/– will be awarded for the best entries.

"Photographic Contest": In each section of both the Home and Overseas contests cash prizes of 15/– and 7/6 will be awarded.

Consolation Prizes will be awarded for other meritorious entries in all contests.

Closing Dates: Home Sections, 22nd December; Overseas Sections, 30th April 1942.

December Photographic Contest

This is the last of our 1941 series of photographic competitions, in which competitors are asked to submit photographs of any kind that they have taken themselves. An entry may consist of more than one photograph, but each print submitted must have on the back of it a title. If a photograph is given a general or fancy title the real name of the place shown also must be written on the back, while the competitor's name and address, and age also must be given.

It is not necessary that the developing and printing should have been done by the competitor. These can have been carried out professionally, so long as the entrant himself has made the exposure. Competitors should take care to avoid including in their photographs any scenes or objects of military, naval or Air Force interest.

Entries will be divided into two sections, A for readers aged 16 and over, and B for those under 16. They should be addressed *"December Photo Contest, Meccano Magazine, Binns Road, Liverpool 13."* There will be separate sections for overseas readers. Prizes and closing dates are given in the panel on the left.

COMPETITION RESULTS

HOME

July "Figureword" Contest.—1. A. B. PARTRIDGE (Northampton); 2. T. D. TASKER (Barnsley); 3. H. BROWN (Glasgow, W.4). Consolation Prizes: B. R. CLARK (Stoke-on-Trent); M. Curtis (Berkeley); G. L. TREDWELL (Wolverhampton).

August "Novel Engine Names" Contest.—Joint 1st, 2nd and 3rd Prizes: K. DAWSON (Duffield); R. P. WALFORD (Lustleigh); J. R. SMITH (Huddersfield). Consolation Prizes: B. A. JOHNSON (Dorking); Miss B. BURRELL (Bristol).

August "Engineering Nightmares" Contest.—1. P. F. MUNDELL (Kidderminster); 2. G. LATHAM (Walton-on Thames); 3. G. WELLS (Wellingborough). Consolation Prizes: M. Kearns (Liverpool, 18); K. MILTON (Leicester); W. WHITAKER (Dewsbury).

September "Questions" Contest.—1. F. MILLS (Kearsley); 2. C. E. WRAYFORD (Bovey Tracey); 3. L. B. SMITH (Lincoln). Consolation Prizes: T. JONES (Dagenham); G. LIMB (Birmingham).

This Bombing Business

(*Continued from page 368*)

of ours, armed with their heavily-armoured four-gun Frazer-Nash turrets, are as near being self-protecting as an aeroplane can be. As the German aeroplanes are armed with cannon-guns we may assume that the big bombers also carry movable cannon-guns in self-defence. Obviously asking a whole battery of short-range machine guns to stand up to cannon-guns would be absurd. So we can say, I think, that not only have we the best and biggest, but also the safest bombers in the world.

Monastic Survivals in Printing

It is interesting to realise that the part played by monks in pioneer printing centuries ago can still be traced in words and customs of the printing trade. It was in monasteries that the greatest use was made of printing when the art was introduced. Composing was often carried out in monastic chapels, and such rooms are called chapels to this day, while the trade union representative in a printing works is always the Father of the Chapel. The word font, used now for styles of type, originated with the use of fonts in churches and chapels as receptacles for wooden blocks, and the place where bad type is put is still called the hell-box. It was the duty of the old-time apprentice to clean out the hell-box, and probably because of this he became known as the printer's devil, another term that has survived until to-day.

Further evidence of the connection is given by many Latin words regularly in use in printing, such as brevier, the size of type originally used for setting up monks' breviaries, compositor and asterisk.

The Sun is very Hot!

We are very much astonished when we learn that the atmosphere exerts a pressure of about 14 lb. on every square inch of the Earth's surface, especially when we realise that this means that every square inch of our own skin is supporting this weight. We do not sink under the load because there is an equal pressure on surfaces within our bodies.

The pressure is very small in comparison with that exerted at the centre of the Earth, which is about 20,000 tons per sq. in. Under such a pressure the hardest rock will flow, if not like water, at least like pitch or some other thick liquid, but huge as the pressure is, it is only a fragment of that at the centre of our Sun, although that is gaseous. The greater part of the mass of the Sun is concentrated towards its centre, and the pressure in the core is 1,700,000,000 tons per square inch.

These figures are the results of the most recent calculations that have been made of conditions within the Earth and the stars. The calculations have given results for temperatures that are even more astonishing, for they show us that the central temperature of the Sun is 25,700,000 deg. C. The temperature only one sixth of the way in is well over 1,000,000 deg. C., and half way down to the centre it has risen to 5½ million degrees.

The matter in the core of the Sun is so dense that a cubic foot weighs more than three tons, but even this is small compared with the density of a dark star that forms a companion to Sirius, the well-known Dog Star. Every cubic foot of this star weighs nearly 1,500 tons.

"Warplanes" No. 2

Our advertisers Real Photographs Company have followed up their recent successful handbook on the identification of British and enemy warplanes by a second that gives interior details of the more outstanding of the aircraft dealt with in the first issue. "*Warplanes*" *No. 2*, as the new booklet is called, contains full-page, half-tone sectional drawings of these famous machines, with the main features clearly marked and labelled. On the opposite page in each case there are fine photographs of the machine dealt with, and a brief but interesting summary of its development, together with details of dimensions, performance and armament.

The new handbook is an excellent supplement to "*Warplanes*" *No. 1*, and is of a size that can be slipped easily into a coat pocket for reading at any leisure moment. It costs 1/6 post free from the publishers, Real Photographs Company (Dept.W.P.2), Tulketh Chambers, Southport, or can be ordered from any bookseller or bookstall.

COMPETITION RESULTS

HOME

September "Photographic" Contest.—First Prizes, Section A, C. A. READER (Guildford); Section B A. ROSE (Ulverston). Second Prizes, Section A, J. MITCHELL (Bradford); Section B, W. M. TAYLOR (Southall). Consolation Prizes: B. CHULINDRA (Rock); R. HOLLAND (London, E.12.); H. R. J. HUNT (London, N.15); J. G. SCOTT (Burnley).

September "Crossword Puzzle" Contest.—1. T. CHAPLIN (Cambridge); 2. D. GRIFFIN (London, N.W.7); 3. A. HONEY (Belper); Consolation Prizes: W. NAGINGTON (Liverpool, 6); R. D. T. ONIONS (Oxford); A. M. TOMPSETT (Lewes).

OVERSEAS

March "Crossword Puzzle" Contest.—1. J. H. GARNER (Capetown, S.A.); 2. R. STROUD (Lucknow, India); 3. P. A. GIBBS (Durban, S.A.); 4. L. WATT (Victoria, Canada).

April "Missing Words" Contest.—1. K. SIMPSON (Johannesburg, S.A.); 2. K. BOOCOCK (Oxford, New Zealand); 3. J. CHAPPELL (New South Wales); 4. D. R. BROWNE (Auckland, N.Z.). Consolation Prize: L. BARTON (Hong Kong, China).

February "Cipher" Contest.—1. W. HYLAND (Dargaville, N.Z.); 2. HELEN BALL (Cape Province, S.A.); 3. D. A. WILSON (Wanganui, N.Z.); 4. G. B. MILLING (Ontario). Consolation Prizes: N. BERRY (Zululand, S.A.); D. C. MARSHALL (Pretoria, S.A.).



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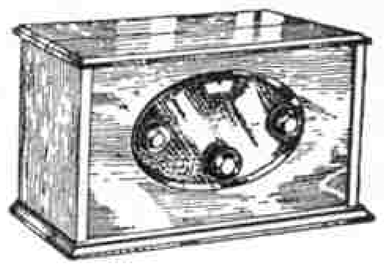
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FIRESIDE FUN

TOO DEEP FOR HIM

A motorist coming to a short piece of flooded road asked a country lad how deep the water was. Getting the reply: "Oh, just about two inches," he started cheerfully through, only to run down a dip so steep that he had to climb through his sunshine roof. Remonstrating angrily with the lad for saying "about two inches," the lad replied: "Well, that's all it cums up on our ducks."

* * * *

The following correction was found in a provincial newspaper: "Our paper stated last week that Mr. John Doe was a defective in the police force. This was a typographical mistake. Mr. Doe is really a detective in the police farce."

* * * *

The vicarage children were saying their prayers one Saturday night and mother asked little Jane to choose a hymn, and she chose "Ere our Sabbath close."

"But that is a hymn for Sunday," said mother.

"No!" said Jane. "We air our Sunday clothes on Saturday."

* * * *

" 'Ow do you like your new neighbour, Mrs. 'Arris?"

"Not much. She's 'aughty, and if there's aught I 'ate it's 'aught."

* * * *

"Are you a clock-watcher?" the employer asked a man applying for work.

"No, I don't like inside work," replied the applicant, calmly, "I'm a whistle-listener."

* * * *

A man advertised a donkey for sale, and when a prospective buyer called, the door was opened by a small boy.

"I have come to enquire about the donkey for sale," said the visitor.

"Father, you're wanted," called the boy.

* * * *

The school visitor found one boy in a room by himself, evidently in trouble. "What's the matter, my boy?" he inquired.

"Palpitation and insomnia" was the reply.

"But you can't be suffering from those things."

"It isn't suffering, sir. It's spelling."

* * * *

Would-be diner: "Waitress, please find out if your colleague from whom I ordered a steak some time ago is still employed here?"

* * * *

Mistress: "I've asked Mr. and Mrs. Smith to dinner at seven, Mary; but I think we'll give them a quarter of an hour's grace."

Mary: "Well, ma'am. I'm religious myself but think that's rather over-doin' it!"

* * * *

The car was crowded and the conductor was irritable.

"Where's the fare for the boy?" he snapped, as the father handed him one fare.

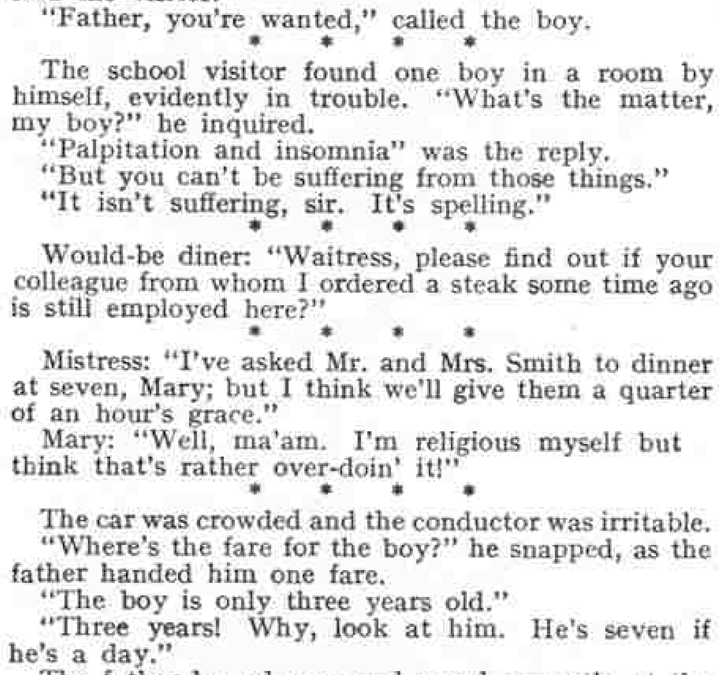
"The boy is only three years old."

"Three years! Why, look at him. He's seven if he's a day."

The father leaned over and gazed earnestly at the boy's face. Then he turned to the conductor.

"Can I help it if he worries?" he asked.

* * * *



Distraught mother: "Georgie, Georgie, for pity's sake, run round in circles and make him giddy."

VERY THOUGHTFUL

Passenger: "Why, didn't you sound your horn when you saw the man in the road?"

Driver: "Well—er—I thought it would be more humane if he never knew what hit him!"

* * *

"Can I trust Jigger?"

"Trust him! Why, he's so crooked that the wool he pulls over your eyes is half cotton."

* * * *



"No—I've had no experience of aircraft work; but I'm red hot on Meccano."

[Courtesy "Aeronautics."]

* * * *

"Yes, I know fish is brain food, but I don't care so much for fish. Isn't there some other brain food?"

"Well, there's noodle soup."

* * * *

ON SIDE

Magistrate (to motorist): "And which side of the road was he on? "

Motorist: "The suicide."

* * * *

He was up from the country and "was doing himself proud."

In a restaurant one evening he watched a man opening a bottle of champagne, and cried out in astonishment as the foam spurted out when the cap was removed.

"Well, what's so remarkable about that?" asked his companion.

"Oh, I'm not surprised about the way it comes out, but how do they get it in?"

* * * *

Some tourists at an hotel in a small Spanish town were looking through the menu when a waiter came to their assistance.

"The ham is not, and the chicken never was," he explained, "so will you have your eggs tight or loose?"

* * * *

A Scotsman had bought some boots. After a month he returned to the shop and asked if the boots could be stretched, as they were tight.

The salesman tried on the boots and exclaimed: "Why, man, they are a perfect fit."

Said the Scotsman: "Och aye, they're no sae bad for me, but they're very tight for ma brither on the nicht shift."

* * * *

On the closing day of a rainy fortnight the seaside visitor read through the hotel bill to the last detail. Then very quietly he remarked: "Well, I'm very glad you have benefited so greatly by my holiday."

* * * *

THIS MONTH'S HOWLER

People go to Africa to hunt rhinostriches.

THAT STOPPED HER!

The newly rich woman was trying to make an impression: "I clean my diamonds with ammonia, my rubies with Bordeaux wine, my emeralds with Danzig brandy, and my sapphires with fresh milk."

"I don't clean mine," said the quiet woman sitting next to her; when they get dirty I just throw them away."

* * * *

He was very hungry, so he pushed open the swing doors of the restaurant and entered. It was a rough, ill-smelling place, but he thought he would try a cup of coffee and something to eat.

The waitress brought coffee in a thick heavy cup.

"Where's the saucer?" he inquired.

"We don't give no saucers here," replied the girl. "If we did, some ill-bred ignoramus would come blowing in and drink out of his saucer, and we'd lose a lot of our swellist customers."

* * * *

He was charged with begging.

"I'm not a lazy man, sir," he pleaded. "I work when I can get work, but I've been out of a job."

"Look at his hands, sergeant," said the magistrate.

The sergeant looked at the prisoner's hands.

"Why sir, it must be years since the old scoundrel did any work. His hands are as soft as mine!"

* * * *

Letter from Dentist: "Dear Sir. Unless the denture you had from me is paid for without delay, I shall be obliged to insert the following advertisement in the local paper: 'Excellent set of false teeth for sale. To be seen at any time at Mr. Smith's, 5, Dettone Terrace'."

The teeth were paid for the same day.

* * * *

At the Christmas party, the little boy had been eating steadily for an alarming length of time. When he asked for another helping the hostess spoke to him earnestly.

"Willie," she said, "I'm quite serious. If you take another helping of trifle, you'll burst."

Willie listened, alarm spreading over his features. He hesitated, and gazed at the dish of trifle. Finally, he sat erect, a study of heroic resolution.

"All right, then," he said, "gimme another helping, and stand clear."

* * * *

Sam Simpson worked hard. All day long he carried heavy iron baulks and girders. Towards evening he said to the foreman, who was a notorious slave-driver: "Boss, you am suah got me down on dat pay-roll, yeh?"

The foreman glanced at his list.

"Yes," he said, "here you are, 'Sam Simpson.' That's right, isn't it?"

"Yaas, boss, but Ah thought mebbe yuh had got me down here as Samson."

* * * *

"What do you think would go well with my purple and green golf stockings?"

"Wellington boots."

* * * *

"Yes," said the mountaineer, "I always have a rope round my waist. It has saved my life more than once."

"It must be pretty awful to find yourself hanging from a rope," said his friend. "Don't you feel nervous sometimes?"

"Well, not exactly nervous—just highly strung."

* * * *

TRY THESE

I chased a big black pug pup up Upper Parliament Street.

Are you copper-bottoming 'em? No. I'm alluminiuming 'em, Mum.

Kris Kringle crushed crispy chocolate cracker crumbs.

Soldiers' shoulders shudder when shrill shells shriek.

Shot striped silk shirts shrunken short.

Thirty thirsty thieves swallowed thirty soothing sips.

* * * *



Captain: "Bit of a swell to-day, sir."

Passenger: "It's very nice of you to say so, but you ought to see me on Sundays."

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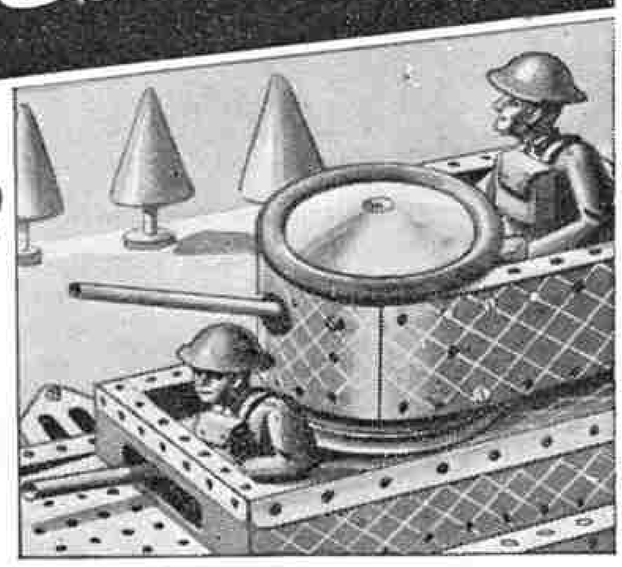
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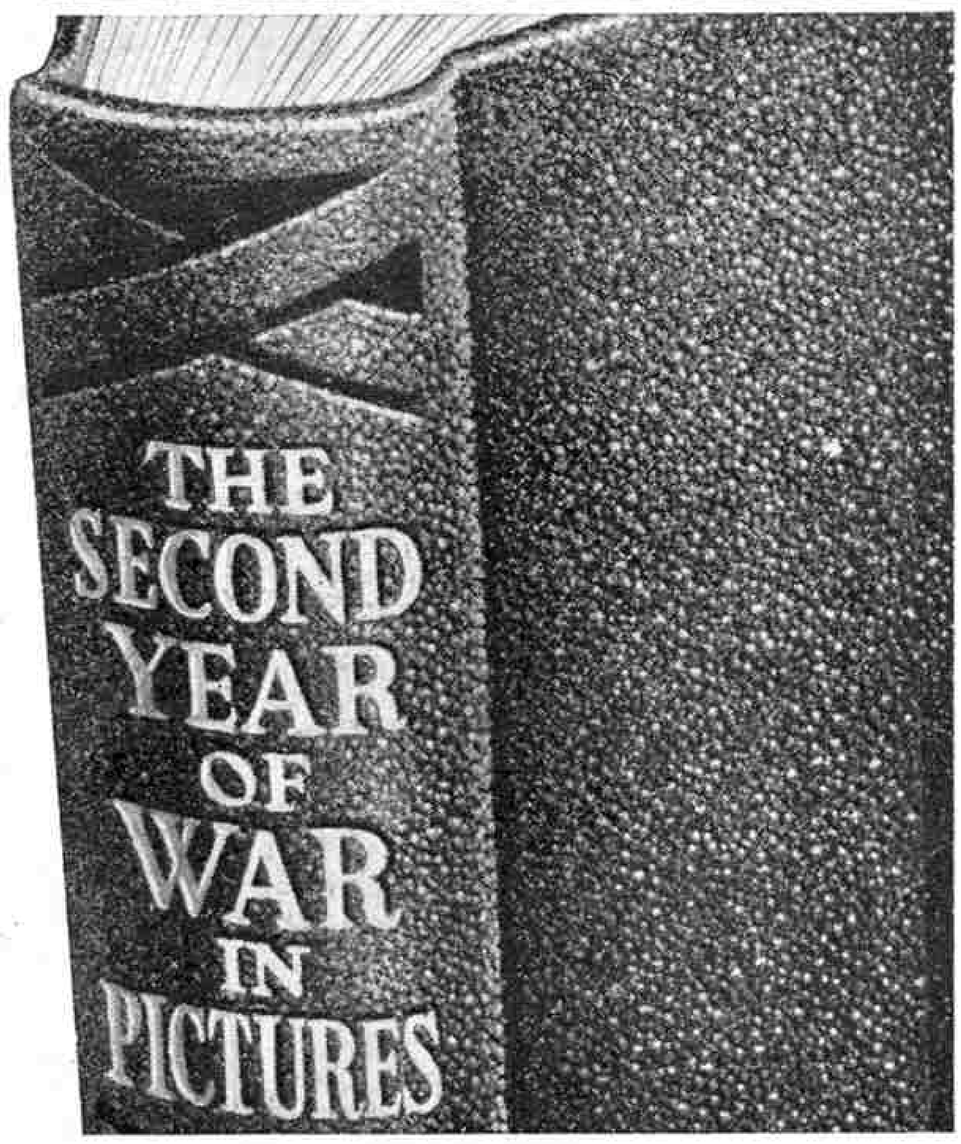
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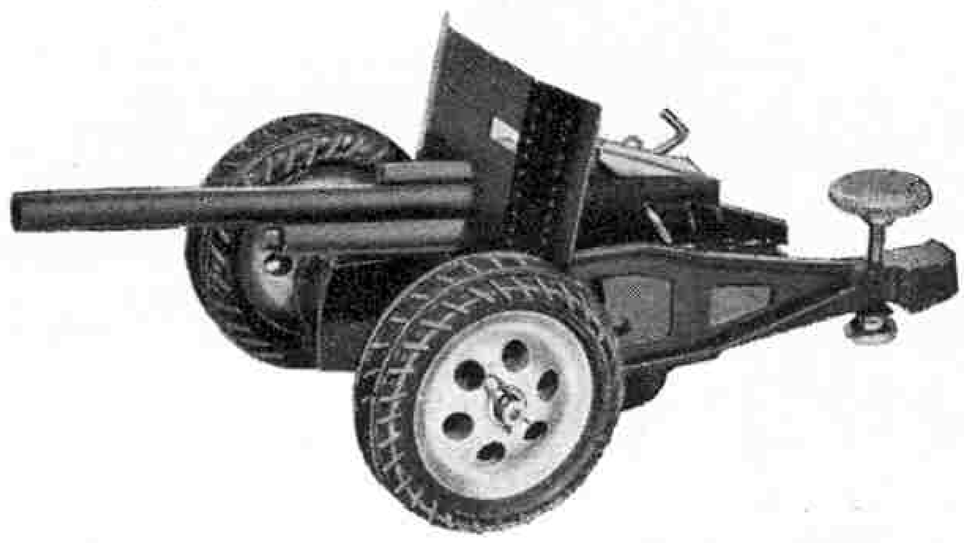
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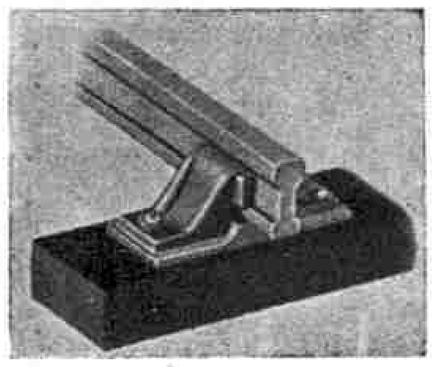


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Readers should note that advertisements of current products of Meccano Ltd. cannot be accepted for this column.

Wanted. One or two pairs of Dublo Electric points; hand or electrically operated.—Reynolds-Jones, "Evergreen," Church Hill Rd., Solihull, Warwickshire.

Wanted. Model Railway, perfect working condition; also Meccano Set. State full particulars.—Smithson, 48, Lyme Road, Meir, Staffs.

Lantern (miniature) F4.5 lens with Binding Materials, suit photographer, club; also some Bromide Paper, Wireless Valves. Write—Rob Hobbs, 83, Curling Crescent, Kings Park, Glasgow.

Wanted. One pair Dublo Electrically-operated Points and Switches.—Thomas, Bryn-llwydwyn, Machynlleth, Wales.

Sale. "Meccano Magazines," June 1939 to September 1941, 11 missing; also "Practical Mechanics," May 1939 to July 1940, two missing. Write for particulars.—Gould, Fulbeck, Grantham.

For Sale. One Bassett-Lowke Clockwork gauge "0" "Princess Elizabeth" Locomotive and Tender, No. 6201; as new; cost £8/8/-.—Middleton, Brampton Manor, Chesterfield.

Voigtlander "Bessa," 3¼ in. × 2¼ in. (8 or 16); Voigtar f/7.7; Single "00," £3/12/6.—Rowley, 154, Station Street, Burton-on-Trent.

For Sale. Clockwork No. 2 Special, Coaches, Trucks, Track, Points, etc.; complete £6; accept £3, or sell separately. Apply—Richards, 95, High Street, Rhymney, Mon.

Wanted. "M.M.," October 1940; in good condition.—R. J. M. Baron, Fernie Bank, Whitbourne, Worcester.

Sale. Book "Britain's Wonderful Fighting Forces"; Field Glasses; two postcard size Albums, each holding 100; 86 Real Photographs of aeroplanes.—Peate, Nova Lane, Birstall, Yorks.

Wanted. Meccano Instruction Leaflets, Nos. 1, 4, 22, 24, 30, 32; good price paid if in good condition.—Frank Rhodes, 22, Laverton Road, East Bowling, Bradford.

Sale. "Meccano Magazines," 1925, 1930-1935, complete, 3/- year; 42 others 1924-1936, 7/-; "Armchair Science," Sept. 1936-April 1937, 2/-; 1,500 various Cigarette Cards, 1924-1938—what offers?; "Electron" Set No. 1, condition as new, 6/- or nearest.—Ludlow, "Ashleigh," Barton, Burton-on-Trent.

Sale. "Railway Wonders of the World," "Modern Wonders," etc.; stamp for list.—Powell, Stanshawes Farm, Yate, Nr. Bristol.

Wanted. Clockwork Boat Motor, suitable for a 40 in. boat hull.—74, Millbrook Road, Southampton.

Wanted. Meccano E6 Motor, also Gears.—M. Littleworth, Couckolds Cross, Whitwell, Hitchin, Herts.

Wanted. One Pair of Dublo Electric Points, hand operated.—McIndoe, 91, All Saints Road, Kings Heath, Birmingham.

Sale. Hornby Tank Train complete with Rails, Trucks, Coaches, Tunnel, Points, Signals, Buffers; cost 90/- two years ago; very good condition; offers wanted.—Sibson, Lexington, Manor Road, Cheadle Hulme, Stockport.

For Sale. "M.M.'s", July 1928-Dec. 1931, in instantaneous Binders (no covers); issues Jan. 1932-Dec. 1934, loose with covers; also odd parts 1923-1928, without covers; offers.—Box M55.

For Sale. Hornby Electric Railway, including eight Trucks and Bassett-Lowke Engine, with four Points and 64 Rails.—M. Shore, Alureds, Northiam, Sussex.

Wanted. Dublo Points, electrically operated; 4 L.H., 1 R.H.; also 4 R.H. and 5 L.H. Dublo Points hand operated.—Lockwood, "Grange Dene," Burley-in-Wharfedale.

Wanted. "M.M.'s": 1938, 1939. Sale: "Hotspurs," etc., ½d.—9, Roseacre, Blackpool, South.

Wanted. Locomotive Stock Book for either 1939 or 1940; write stating price and year to—Demain, 53, Scholes Lane, Prestwich, Manchester.

Sale. 167 consecutive "Modern Wonders," 14/- post free.—Johnson, 268, Kingspark Avenue, Glasgow S.4.

Sale. "M.M.s," Sept. 1932-Sept. 1941; complete; perfect condition; £1.—44, Penwortham Road, Sanderstead, Surrey.

Wanted. Dublo electrically-operated Points; switches if possible. Send details and price to—Jaques, 28, Manor Drive, Upton, Wirral.

Sale. Hornby Rails, Rolling Stock, Accessories; good condition; cost over £7; to clear accept £5; stamp for list.—Connold, Connys, Lewes Rd., East Grinstead.

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Wanted. "Magnets" copies before February 1936, also a few later.—Shaw, 6, Colney Hatch Lane, London N.10.

Wanted. Collection of Stamps; particulars and price to—Price, 36, Tyrfran Avenue, Llanelly, South Wales.

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Wanted. Frog Penguin Heinkel 111K, Dornier 215, or Messerschmitt 110. Write, stating price, to W. Hill, 63, Oak Street, Burton-on-Trent, Staffs.

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Wanted. Used Trix Motor Coach, or whole Train (S.R.).—Wigdahl, Longcroft, Devizes.

Wanted. "Meccano Magazines" Jan. to April (inclusive) 1941.—D. Wright, 4, The Parade, Claygate, Surrey.

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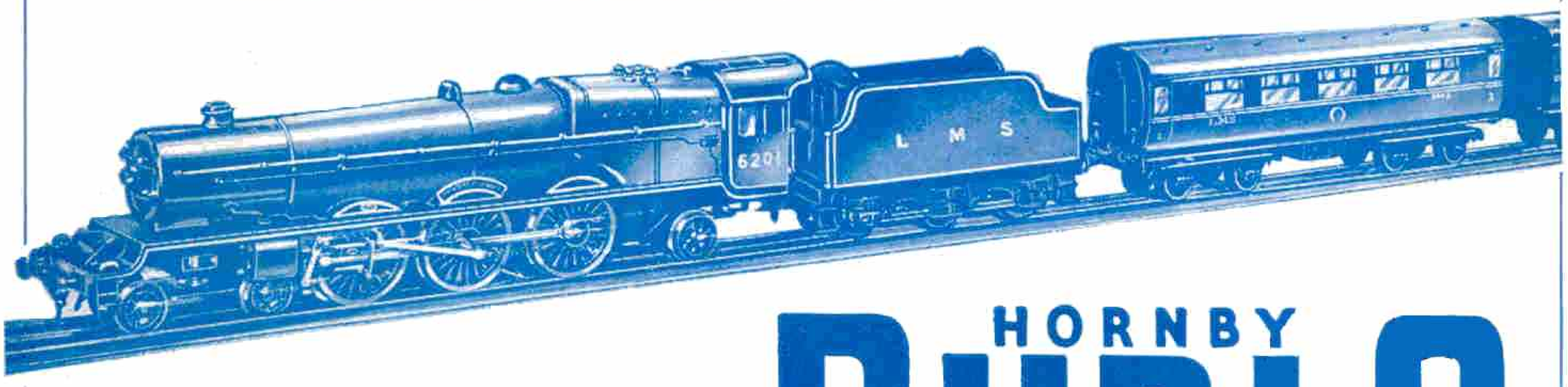
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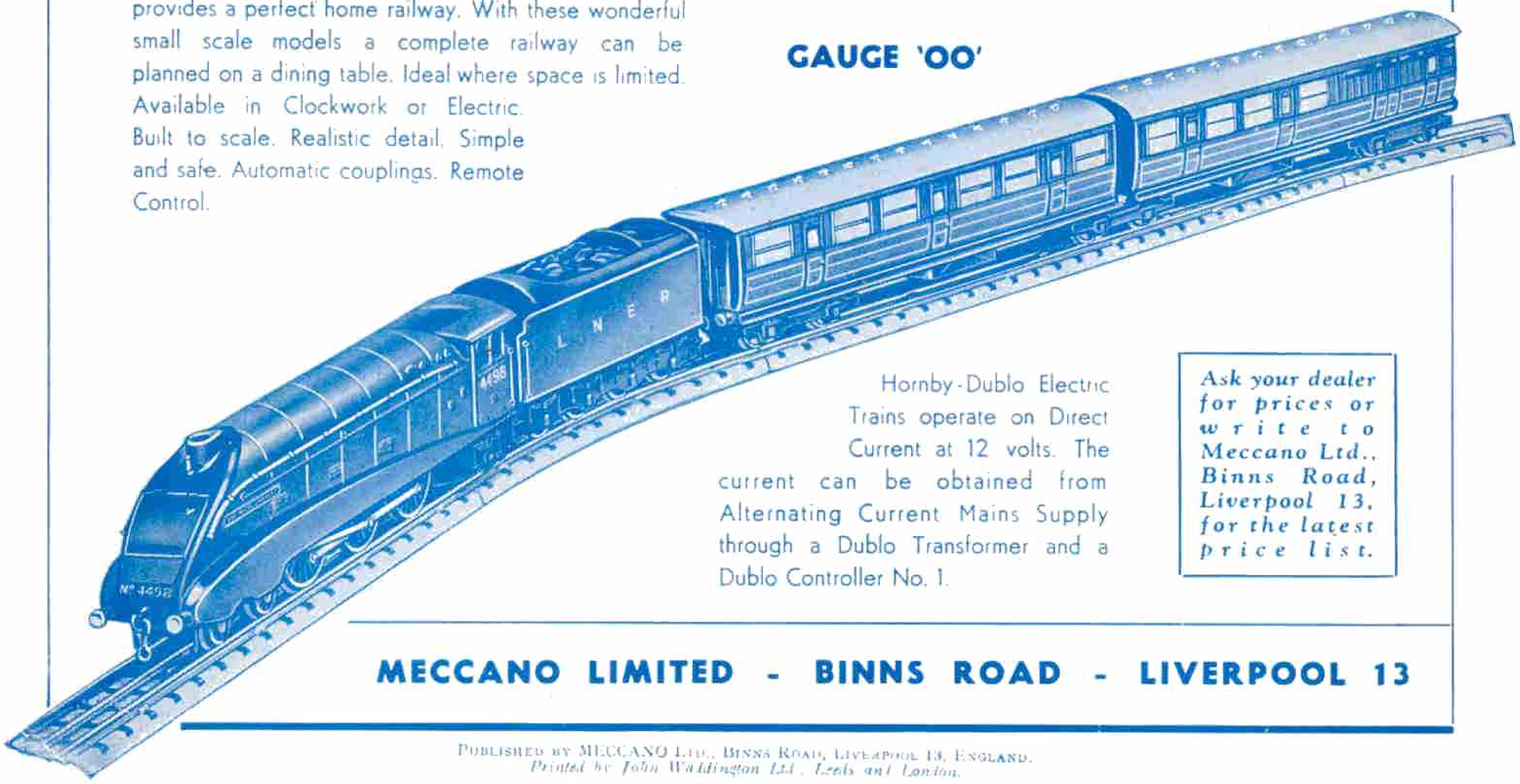


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